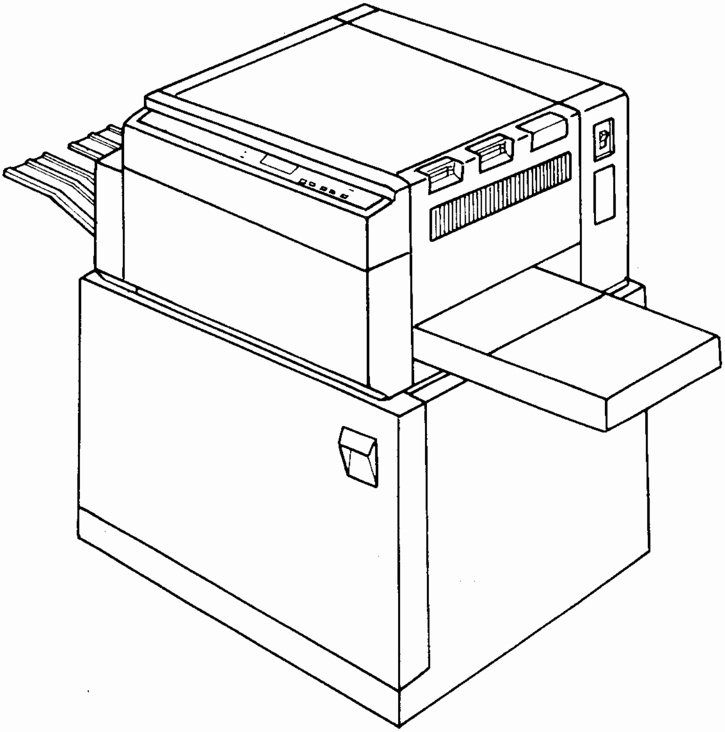
VM2200
PAGE PRINTER
USER'S MANUAL



FUJITSU

VM2200
48FH5067E-01A

WARNING!

This printer is a Laser Class 1 device as defined in BS4803 and IEC 825 specifications. Printing is carried out using a laser beam.

The laser is entirely contained within an enclosed housing and cannot present any risk whatsoever to the user.

Any operation on the printer other than as defined in the supplied user manuals should not be attempted other than by an authorised Fujitsu representative.

This document contains technology relating to strategic products controlled by export control laws of the producing and/or exporting countries. This document and a portion thereof should not be exported (or reexported) without authorisation from the appropriate governmental authorities in accordance with such laws.

FUJITSU LIMITED

ERRATA

This User's Manual uses the typeface names "HELV" and "TMSRMN"for two of its resident fonts. In future editions of this User's Manual the typeface names "SWISS" and "DUTCH" may be used in place of "HELV" and "TMSRMN" respectively. All functions and operations, relative to the resident fonts, and their appearence, will remain the same.

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48FH5067E-01A, October 1990

Federal Communications Commission Radio Frequency Interference Statement for United States Users

This equipment generates and uses radio frequency energy. If it is not installed and used properly, that is, in strict accordance with the manufacturer's instructions, it may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a class A computing device in accordance with the specification in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference in residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna
- Relocate this equipment with respect to the receiver
- Move this equipment away from the receiver
- Plug this equipment into different outlet so that this equipment and the receiver are on different branch circuits

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems". This booklet is available from the US Government Printing Office, Washington, D.C., 20402, Stock No. 004-000-000345-4.

WARNING!

The use of a non-shielded interface cable with the referenced device is prohibited. The length of the interface cable must be 3m or less. The length of the power cable must be 3m or less.

For German Users

Dieses Gerät entspricht als Einzelgerät den Funkentstörungsanforderungen der Postverfügung Nr. 1046/1984 bzw. der Grenzfläche B nach VDE 0871/6.78.

Das Kabel muß abgeschirmt und unter 3 Meter lang sein.

For Canadian Users

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le Présent appareil numérique n'émet pas de bruits radio-électriques dépassant les limites applicables aux appareils numériques de la class A prescrites dans le Règlement sur le brouillage radio-électrique édicté par le ministère des Communications du Canada.

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ABOUT THIS MANUAL

This manual describes the operation of the Fujitsu VM2200 page printer as manufactured at the time of publication.

Every effort has been made to ensure that the information included in this manual is complete and accurate. Fujitsu has reviewed this material but cannot be held responsible for any errors or omissions.

We reserve the right to make changes and improvements to this product without obligation to incorporate these changes and improvements into units previously shipped.

TABLE OF CONTENTS

QUICK START

To use the printer immediately after unpacking, follow the directions given in the quick start chart below.

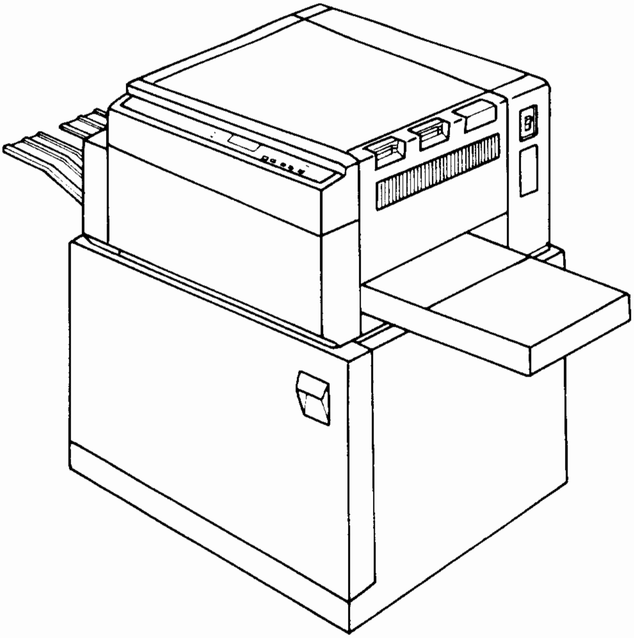
What to do:	What to check:	Page:
Check the printer location	Room environment	2.3
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Install the components	Paper cassette, stacker, process cartridge etc.	2.7
Connect and turn on the power	Correct voltage and outlet	2.16
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See **section 7** for troubleshooting procedures.

1. INTRODUCTION

Features

Congratulations on purchasing this laser printer. You have chosen a printer that will provide many years of reliable operation. The printer is ideal for a great many applications including word-processing, desktop publishing and any situation that requires a high throughput or output onto large paper.



The printer

Speed and Resolution

This is a 300 dpi, 22 A4 pages per minute printer with a recommended duty cycle of up to 25,000 pages per month. Up to 255 copies of a single page can be printed from data stored in the printer's memory.

Paper Handling

The printer's standard cassette feed and optional second cassette feed can each hold up to 250 sheets of paper. The optional large capacity hopper holds 1,000 sheets. Paper sizes between A6 (105 mm x 148 mm) and A3 (297 mm x 420 mm) are acceptable.

Fonts

Seven resident fonts are available on the printer and optional, plug-in IC cards allow a range of other fonts to be used.

Emulation

The printer offers a number of modes which allow it to emulate other commercially available printers and operate in LAYOUT document description language (DDL) mode. The printer can also produce a hexadecimal and ASCII printout of the incoming data stream when operating in HEX mode.

Interfaces

The printer is supplied with RS-232C serial and Centronics parallel interfaces as standard.

Control Panel

Many of the printer's features can be selected from the front panel. Font, page format, emulation and others can all be set in this way.

Options

There are a number of options available for the printer. They can be obtained from your dealer and include the following:

A3 Paper Cassette	Part no. :	B02L-7470-0010A#01
A4 Paper Cassette	Part no. :	B02L-7470-0010A#02
Letter Paper Cassette	Part no. :	B02L-7470-0010A#08
Legal Paper Cassette	Part no. :	B02L-7470-0010A#07
Ledger Paper Cassette	Part no. :	B02L-7470-0010A#06
Second Cassette Feed	Part no. :	B02B-7310-B313A (exclude Paper Cassette)
	Part no. :	B02B-7310-B314A (include A4 Paper Cassette)
	Part no. :	B02B-7310-B315A (include Letter Paper Cassette)
	A second cassette feed, which fits beneath the printer and requires a paper cassette, is available. The second feed can hold 250 sheets of paper.	
Large Capacity Hopper	Part no. :	B02B-7310-B501A#6D (AC 100 to 120 Voltage)
	Part no. :	B02B-7310-B501A#7D (AC 220 to 240 Voltage)
	A large capacity hopper, which fits beneath the printer, is available. The large capacity hopper can hold up to 1,000 sheets of paper.	
Face Down Stacker	Part no. :	950740001
	Description :	FLIPPER
	Face-down collation without job separation control. The stacker can hold up to 500 sheets of paper.	
Font Cards	Additional fonts, other than those resident in the printer, are available on IC cards.	

2. INSTALLING AND SETTING UP THE PRINTER

Introduction

This chapter provides a step by step guide to installing and setting up the printer for immediate use. The steps are:

- Selecting a good location
- Checking items received
- Getting acquainted with printer parts
- Installing printer components:
  - Print drum
  - Developer unit
  - Toner cartridge
  - Paper cassette
  - Output tray
  - Power cord
- Printing a test page and adjusting print density
- Connecting the printer to a computer
- Selecting an emulation
- Printing a sample page from the computer.

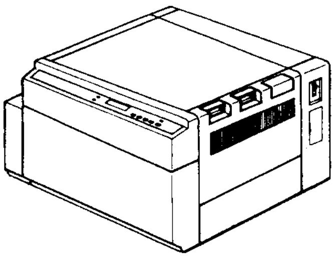
Selecting a Good Location

The printer will operate well in a normal office environment. Certain requirements must, however, be met when choosing a suitable location for the printer.

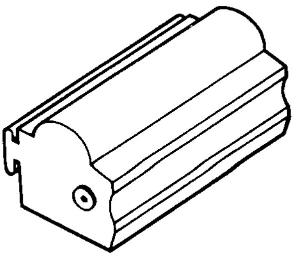
- Locate the printer in a well ventilated, dust-free room
- Place the printer on a stable, level surface, well away from any heat source
- Do not expose the printer to direct sunlight
- Do not expose the printer to extremes of temperature or humidity. Ideally, the printer should operate within a temperature range of 10°C to 35°C (50°F to 95°F). Humidity should be within a range of 20% to 80%
- Do not block the air outlet from the printer fan
- Do not use a power point that also supplies equipment that may cause power surges or sudden loss of power.

Checking Items Received

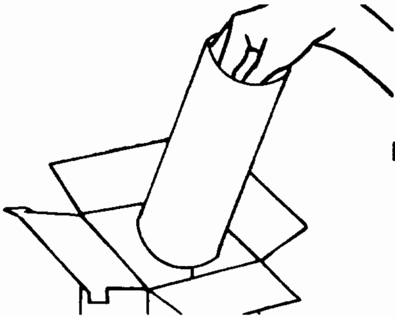
Check the following parts to see that none are damaged or missing:



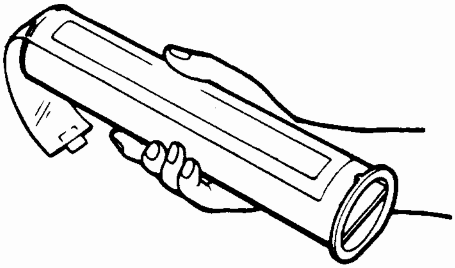
Printer



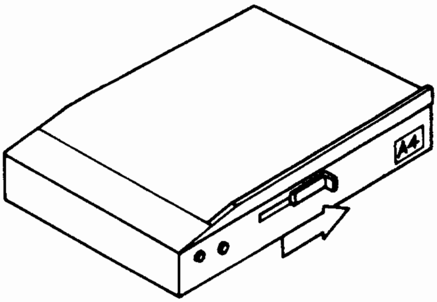
Developer unit



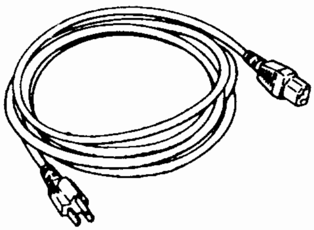
Photoconductive drum



Toner cartridge



Paper cassette



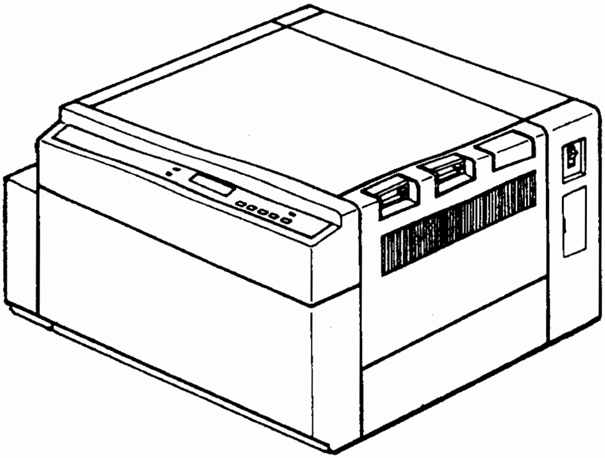
Power cord



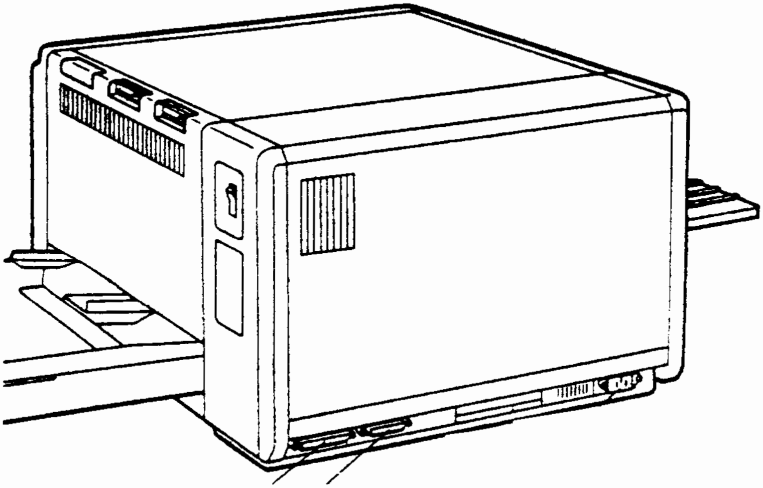
If any of the above are damaged or missing, please contact your dealer.

Getting Acquainted with Printer Parts

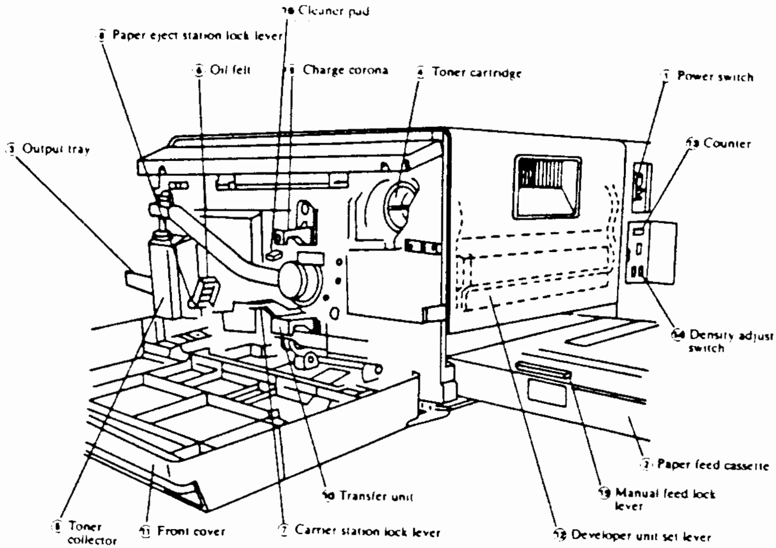
Before attempting to install the printer's various components, take some time to become familiar with all its basic parts.



The front of the printer



The back of the printer

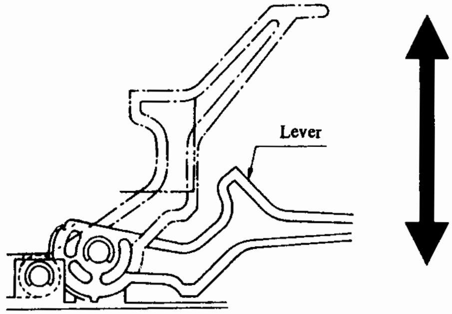


Inside the printer

Installing Printer Components

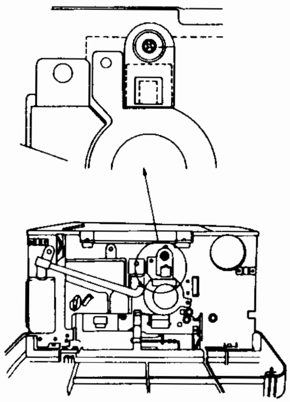
Print Drum

1. Lower the carrier station locking lever.



Lowering the carrier station locking lever

2. Pull out the charge corona unit and place it on a level surface.

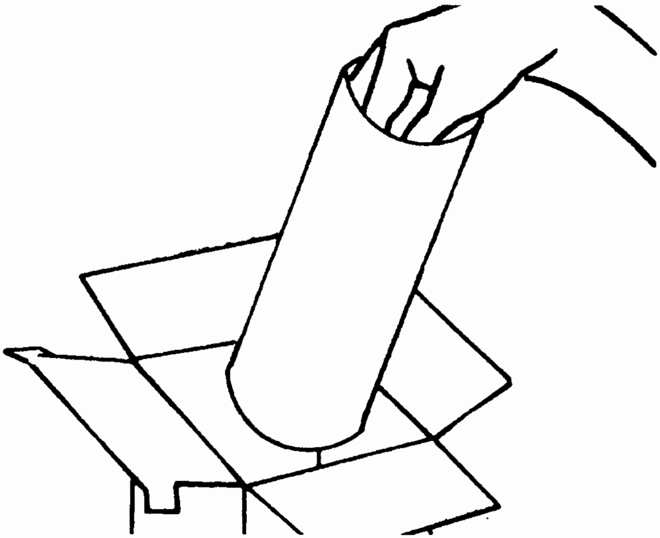


Removing the charge corona unit

3. Rotate the drum locking handle, situated below the charge corona unit, through 90 degrees anticlockwise.
4. Pull out the drum locking handle and place it on a level surface.
5. Stand the drum box on end, taking care to ensure that it is the correct way up. Carefully remove the sealing tape from the top of the box and open it fully.

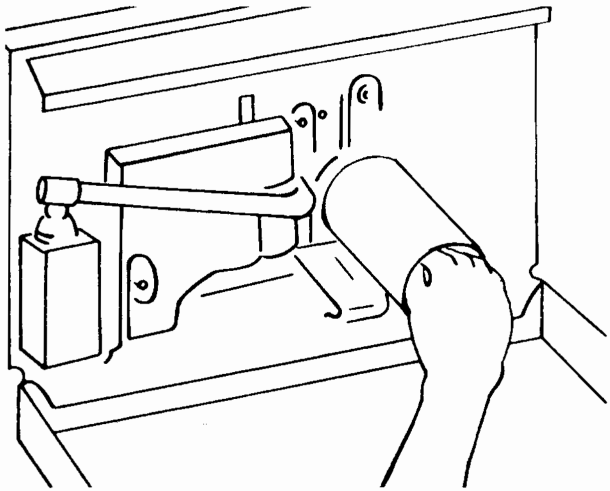
WARNING!
Do not touch the polished, outer surface of the print drum or allow it to touch any other material. Damage to the drum's surface will lead to deterioration in print quality.

6. Place your fingers inside the photoconductive drum and pick it up by exerting an outward pressure with your fingers.



Picking up the photoconductive drum

7. Carefully slide the drum over the inner drum inside the front of the printer.



Inserting the drum

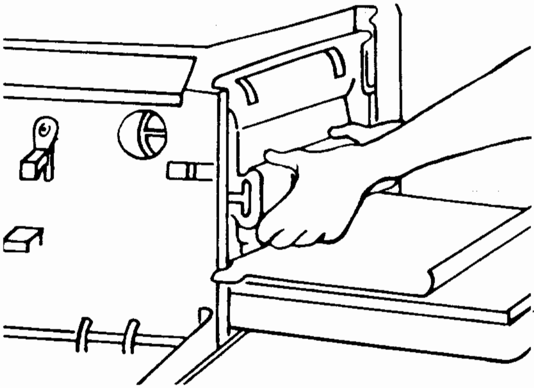
8. Taking care not to touch the outside of the drum, slide it all the way in and push the end gently until it stops.
9. Slide the print drum locking handle back into position, ensuring that the positioning plate fits onto the two locating pins on the printer.
10. Rotate the print drum locking handle through 90 degrees clockwise.
11. Replace the charge corona unit, sliding it all the way until it stops.
12. Lift the carrier station locking lever until it locks in place.

Developer Unit

1. Open the developer unit pack and remove all packing material from the unit.
2. Holding the developer unit by the green plastic rail, slowly offer it into the right side of the printer.

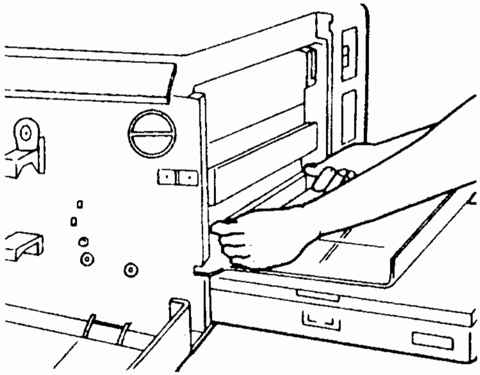
WARNING!
Do not allow the full weight of the developer unit to rest on the printer's side cover.

Slide the developer unit all the way in until it clicks into position.



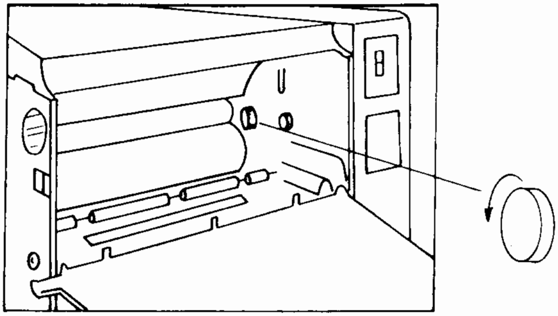
Inserting the developer unit

3. Press down both ends of the developer unit locking lever until the locating lugs slot fully into the horizontal locking plate.



Pressing down the developer unit locking lever

If you cannot press the locking lever far enough for it to engage into the locking plate, carefully remove the developer unit. Rotate the drive gear inside the printer as shown in the illustration. Then refit the developer unit as described above.

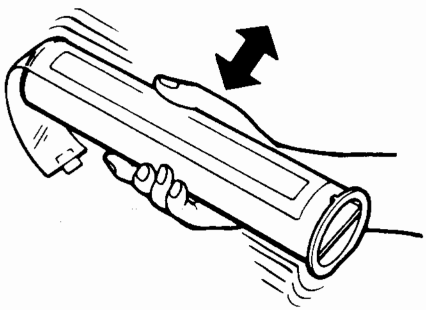


Rotating the drive gear

4. Close the printer's side and front covers.

Toner Cartridge

1. Open the front cover of the printer.
2. Remove the toner cartridge from its packing and shake it from side to side so that the toner is laid evenly along the length of the cartridge.

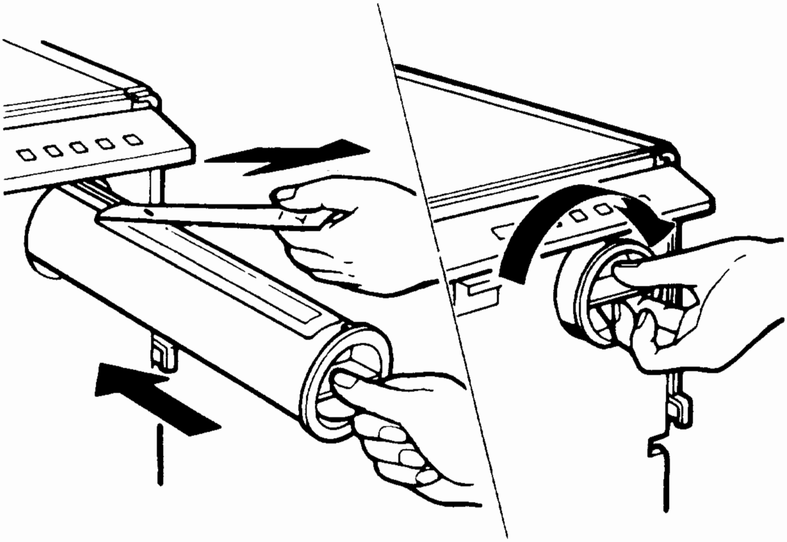


Shaking the toner cartridge

3. Loosen the end of the sealing tape on the toner cartridge and insert the end of the cartridge into the opening in the printer.

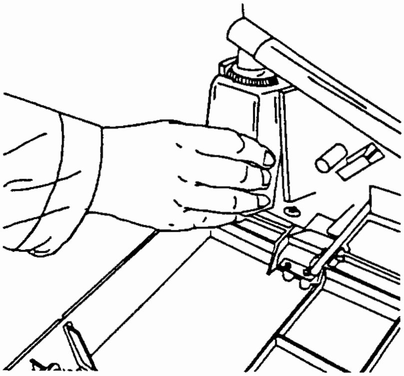
WARNING!
Ensure that the opening in the toner cartridge faces upwards.

4. Gently push the toner cartridge into the printer, removing the sealing tape as it goes in. As the seal comes away from the cartridge altogether it should be almost all the way into the printer.
5. Ensure that the toner cartridge is pushed fully into the opening and then turn it through 180 degrees clockwise so that the handle is again horizontal.



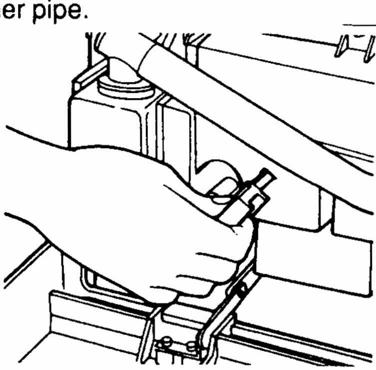
Inserting the toner cartridge

6. Fit the toner collector bottle beneath the end of the used toner pipe.



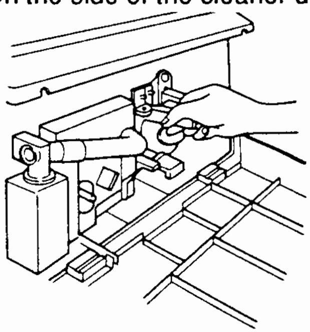
Fitting the toner collector bottle

7. Slide the oil felt into the opening just below the middle of the used toner pipe.



Fitting the oil felt

8. Slide the cleaner pad into the bracket on the cleaner unit. This bracket is on the side of the cleaner unit nearest the drum.

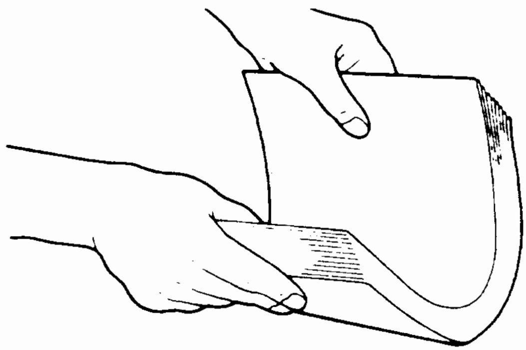


Fitting the cleaner pad

9. Close the front cover of the printer.

Paper Cassette

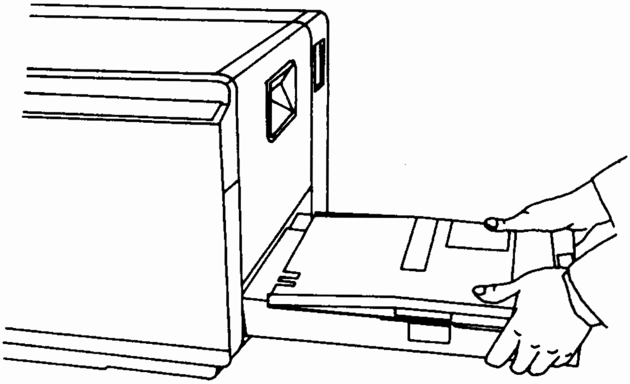
1. Remove the paper cassette from the printer and lift off the cassette cover.
2. Take about 250 sheets of paper and riffle the pile backwards and forwards several times to prevent the sheets from sticking together.



Riffling the paper

3. Place the paper into the cassette ensuring that the leading edge of the paper (ie the edge that will enter the printer first) is pushed below the metal restraining tabs.
4. Rock the cassette backwards and forwards a few times to ensure that the paper is settled in the cassette.
5. Replace the cassette cover and check that the manual feed slide on the side of the cassette is pulled fully back away from the leading edge of the paper.

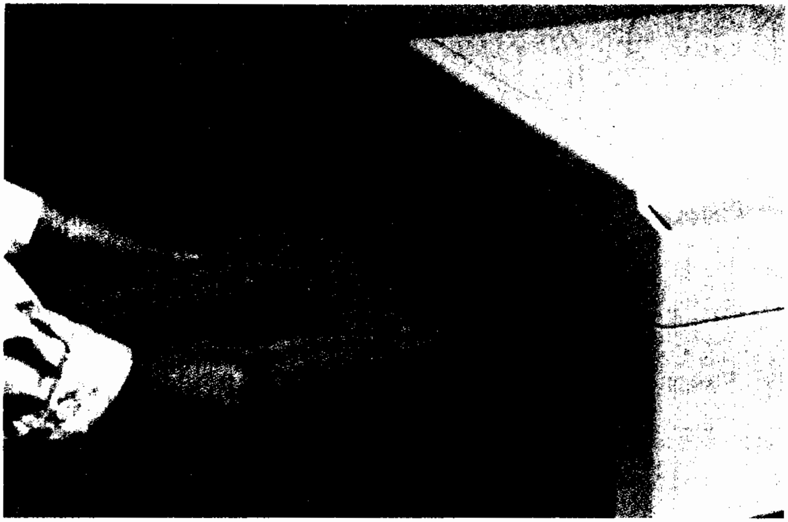
6. Fit the paper cassette to the side of the printer.



Fitting the paper cassette

Output Tray

1. Fit the locating lugs on the output tray into the corresponding holes on the side of the printer.



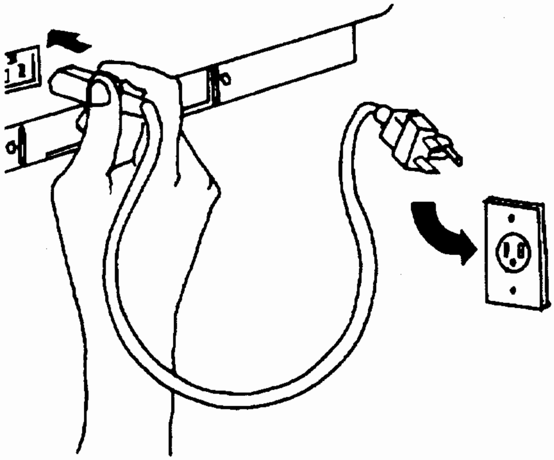
Fitting the output tray

Power Cord

WARNING! This printer must be earthed.

To avoid the possibility of radiation interference, use a power cord that is shorter than three metres.

1. Ensure that the printer's power switch is in the OFF position. If not, press "O" on the power switch.
   The printer's power switch is located on the right hand face of the printer, towards the back.
2. Plug the power cord into the socket on the back of the printer and attach the other end to the power supply.



Connecting the AC power cord

3. Switch the printer on by pressing "I" on the power switch.

Printing a Test Page and Adjusting Print Density

The printer can print a number of reports on the current printer state and configuration. It is useful to print one of these reports after installing and setting up the printer to check its operation and print quality.

To print a report page and adjust print density:

1. Press "I" on the POWER switch. The printer's front panel will display the following sequence:
   - The POWER indicator lights
   - The CHECK and ONLINE indicators light
   - The CHECK indicator goes out
   - The LCD will display the date and time as shown below:

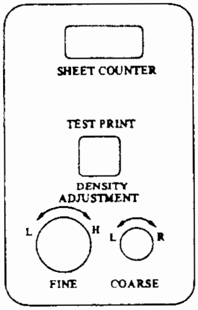
   `OCT 10  12:00:00`

2. Now the printer is ready, carry out the following sequence:

What you do:	What you see:
Press the ⇓ key	`SELECT │action`
Press the ⇓ key	`action │print`
Press the ⇓ key	`print │SETUPS`
Press the ⇓ key	`SETUPS`
	`SETUPS+`
	`SETUPS   A4`
After printing the setup report sheet, the printer returns to a ready state.	`OCT 10  12:00:21`

3. If the print density is too light or too heavy, adjustments can be made with the print density controls. The print density controls are to be found behind a hinged panel which is situated below the power switch on the right face of the

printer. There are two print density controls, one for coarse adjustments and one for fine adjustments.



Adjusting print density

It is also possible to print a test page by pressing the test print button. This button is situated behind the hinged panel with the print density controls. Pressing the test print button only causes the printer to carry out a hardware test by printing a lined pattern on the sheet of paper.

Connecting the Printer to a Computer

The printer can be connected to a host computer by either a parallel (Centronics) interface or serial (RS-232C) interface. The two interface connectors are at the bottom left of the back face of the printer.

WARNING! Do not attempt to use both of the interface connectors at the same time.

The type of cable you use to connect your printer to a host computer depends on a number of factors.

- **The type of interface connectors your computer has.** Many computers have both parallel and serial connectors but one of them may already be linked to another device.
- **The distance between the computer and the printer.** When using the parallel interface, the connecting cable should not exceed three metres. Cable length can exceed three metres if you are using the serial connector, however. This will be necessary when the printer has to be placed well away from the computer, when connected to a network for example.
- **The speed of data transfer required.** When a high communication speed is required, the parallel interface should be used. Even at its fastest setting, the serial interface is slower than the parallel interface.

Connecting a Parallel Interface Cable

Obtain a parallel interface cable that has a 36 pin, shielded male contact.

To connect the cable to the printer:

1. Turn off the printer and computer.

> **WARNING!**
> **Connecting an interface cable with the power on may seriously damage your printer or computer.**

2. Attach the cable to the connector and push the clip fasteners into place to secure it.
3. Refer to your computer's user documentation for details of how to connect the cable to the computer.

Connecting a Serial Interface Cable

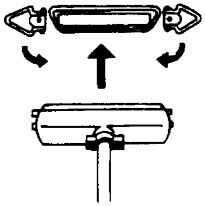
Obtain a serial interface cable that has a 25 pin male contact.

To connect the cable to the printer:

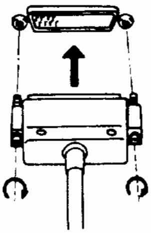
1. Turn off the printer and computer.

WARNING!
Connecting an interface cable with the power on may seriously damage your printer or computer.

2. Attach the cable to the connector and tighten the connector screws to secure it in place.
3. Refer to your computer's user documentation for details of how to connect the cable to the computer.



Attaching a parallel interface connector



Attaching a serial interface connector

Selecting an Emulation

The printer supports the following emulations:

- HP LaserJet Series II
- Diablo 630
- Qume Sprint 11
- Epson FX-80
- IBM Proprinter
- Fujitsu M304X Line Printer

Additionally, the printer will produce a hexadecimal and ASCII file dump of the incoming data stream, and operate in LAYOUT mode. LAYOUT is a Document Description Language (DDL) offering a number of page layout and graphic functions.

When selecting an emulation, first check the list of printers that

your software supports.

If for example, the required emulation is HP LaserJet, follow these steps:

What you do:	What you see:
1. Turn the printer on	`OCT 10  12:00:00`
2. Press the ⇓ key	`SELECT |action`
3. Press the ⇒ repeatedly until **mode** is displayed	`SELECT mode`
4. Press the ⇓ key to display the emulation currently set	`mode=DIABLO`
5. Use the ⇐ and ⇒ keys until the HP LaserJet emulation is displayed	`mode LJET`
6. Press the ⇓ key	`mode=LJET`
7. Press the ONLINE key	`OCT 10  12:00:30`

Printing a Sample Page from the Computer

You are now ready to print from the computer.

Printing With a Parallel Interface

To test communication between the printer and the host computer, try to print from one of your software applications, such as a word-processor or programming language. If your computer is an IBM PC/AT or compatible and you are using the parallel interface, you can also try the following BASIC program:

1. Start BASIC and type the following program:

```
10 LPRINT "ABCDEFGHIJKLMNOPQRSTUVWXYZ"
20 LPRINT "Communication successful!!"
30 LPRINT CHR$(13)
40 LPRINT CHR$(12)
50 END
```

2. Type RUN and the printer should print:

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
Communication successful!!
```

If so, your computer and printer are properly connected.

Printing With a Serial Interface

To test communication between the printer and the host computer, try to print from one of your software applications, such as a word-processor or programming language.

If the printer does not print correctly or cannot print, refer to your computer documentation and chapter four of this manual to set the serial options correctly.

If your computer is an IBM PC/AT or compatible and you are using the serial interface, you can also try the following BASIC program:

1. Start BASIC and enter the following program:

```
10 OPEN "COM1:9600,N,8,1" AS#1
20 PRINT #1, "ABCDEFGHIJKLMNOPQRSTUVWXYZ"
30 PRINT #1, "Communication successful!!"
40 PRINT #1, CHR$(13)
50 PRINT #1, CHR$(10)
60 CLOSE #1
70 END
```

2. Type RUN and the printer should print:

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
Communication successful!!
```

If so, your computer and printer are properly connected.

3. USING THE PRINTER

Introduction

This chapter describes some of the basic operations of the printer, including:

- Turning the printer ON and OFF
- Getting acquainted with the control panel
- An overview of the menu system

Turning the Printer On and Off

The power switch is located on the right side of the printer at the back.

To turn the printer on:

Press "I" on the POWER switch. The printer's front panel will display the following sequence:

- The POWER indicator lights
- The CHECK and ONLINE indicators light
- The CHECK indicator goes out
- The LCD will display the date and time as shown below:

```
OCT 10  12:00:00
```

The printer is now ONLINE and ready to receive data. To turn the printer off, press "O" on the power switch.

WARNING!
Do not turn the printer off when it is printing.

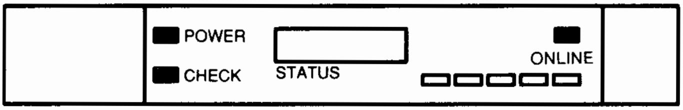
Getting Acquainted with the Control Panel

This section describes the printer's control panel and provides an overview of the menu system. It will help you to familiarise yourself with the menu system and show you how to move around its various levels.

The Components of the Control Panel

The control panel has the following components:

- A POWER indicator
- An ONLINE indicator
- A CHECK indicator
- A 16 character liquid crystal display (LCD)
- 4 arrow keys (⇐⇑⇓⇒)
- An ONLINE key



The control panel

The Indicator Lights

POWER	The POWER indicator lights when the power is switched on and remains lit. until the power is switched off.
ONLINE	The ONLINE indicator lights to indicate that the printer is ONLINE and ready to receive data. When the ONLINE indicator is flashing, the printer is receiving data.
CHECK	When the red check indicator is on, a check condition has occurred. This means that there has been an error which the printer cannot resolve and has, therefore, halted operation. When the CHECK indicator is on, the host computer will be unable to send further data to the printer and may appear to 'hang'. A message will be displayed on the printer's LCD. A list of possible messages and their

meanings can be found in chapter 7 of this manual.

The Display

The printer has a 16 character liquid crystal display (LCD) which displays the printer status and various menu items as you select printer operating modes. The LCD also displays error messages.

The Busy State: When data is being received and/or printed, the display will enter the busy state. The display will show the document number and page number. For example, while the printer is working on page 10 of document 5, the display will show:

```
5.10
```

The whole page image is created in the printer before printing begins and, when one page is being printed, data for the next is being processed. To indicate that the next page is being processed, a + sign is displayed after the document and page number. For example, when the display shows:

```
5.10+
```

the printer is processing page 11 of document 5.

The page number is updated as the printer begins printing that page. So, when the printer is processing the first page of document 6, for example, the screen shows:

```
6.0
```

When multiple copies of each page are being printed, the page number displayed stays the same for each.

The Wait State: If, during the processing of a document, the printer is held up for more than one second by lack of data from the host computer, it enters the WAIT state.

While in the WAIT state, the LCD shows the document and page number at the left (as described above) and the time at the right.

For example, the LCD might show:

```
6.4+      12:00:00
```

The Pause State: If, during printing, you cause the printer to enter either the SELECT or the SETUP menu, the printer does so in the PAUSE state. In the Pause state, you can move around the menus in the normal way and display printer settings. Printer settings may not be changed while the printer is in the Pause state however.

If you enter the SELECT menu during printing, the LCD will initially show the following:

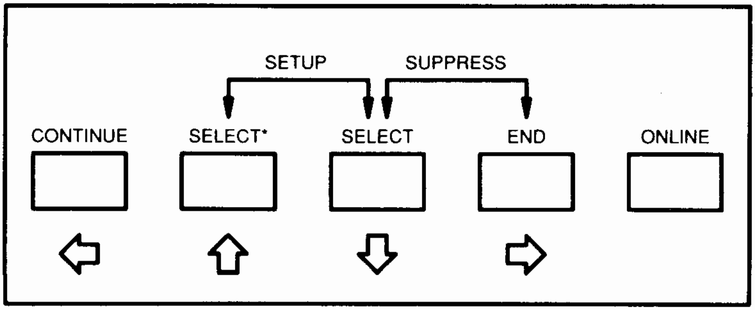
```
PAUSE   |action
```

If you enter the SETUP menu during printing, the LCD will initially show the following:

```
*PAUSE*|crlf
```

The Arrow Keys

The four arrow keys (⇐⇑⇓⇒) allow you to enter and move around the two printer menus and select any of the actions and options required.



The arrow keys

Other uses of these four keys are listed here:

The ⇐ Key

The ⇐ key is used to cause the printer to continue operation in any of the following circumstances:

Wrong paper size. Following the report of a wrong paper size on the LCD, you may continue using the currently loaded paper by pressing the ⇐ key. However, when a page has been formatted for a particular paper size, using the wrong size may cause unpredictable results.

Manual feed. When prompted by the LCD to place paper in the manual feed slot, pressing the ⇐ key will cause the printer to feed paper from the default paper source.

> **WARNING!**
> **Do not press the ⇐ key after a paper jam, data from the current page will be lost.**

The ⇑ Key

This key allows entry into the SETUP menu. For a full description of the SETUP menu and its uses see chapter four.

The ⇓ Key

This key allows entry into the SELECT menu. For a full description of the SELECT menu and its uses see chapter four.

When used in conjunction with the ⇒ key, incoming data can be suppressed. To suppress data be received by the printer, press down both the ⇓ and ⇒ keys and hold them for more than one second. Any

following data will continue to be processed by the printer but will not be printed.

The ⇒Key

At the end of a document, your application software may not send the appropriate code to eject the last sheet of paper. Similarly, if printing is terminated abnormally, then the last sheet of paper may not be ejected. To eject the last page of the document, press the ⇒ key. If no printable data has been received by the printer since the last page was ejected, pressing the ⇒ key will have no effect.

The ONLINE key

The ONLINE key may be used to switch the printer on-line or off-line. When the printer is on-line the ONLINE indicator will be on. When the printer is off-line, it will be unable to receive any further data until it is switched on-line.

An Overview of the Menu System

The printer has two main menus that allow you to select any of the printing actions and options required.

The two menus are:

- The SELECT menu
- The SETUP menu

The SELECT Menu

The SELECT menu is used to set a number of facilities and operating modes on the printer. Number of copies of each document, emulation mode, font, margin sizes and so on can all be set using this menu. In chapter 2, for example, you used the SELECT menu to change the printer's emulation.

The SELECT menu can be used in one of two ways. You can make temporary changes to the printer's operating mode that will last until the printer is switched off. Alternatively, you can change to a new default operating mode that will be stored in memory as a new default set-up for later use (see SETUP: action: FREEZE1 to FREEZE4 in chapter four).

A diagram of the SELECT menu appears opposite.

The top-level items in the SELECT menu are:

- action
- copies
- feed
- mode
- font
- symset
- margins
- orient
- lpi
- style
- report

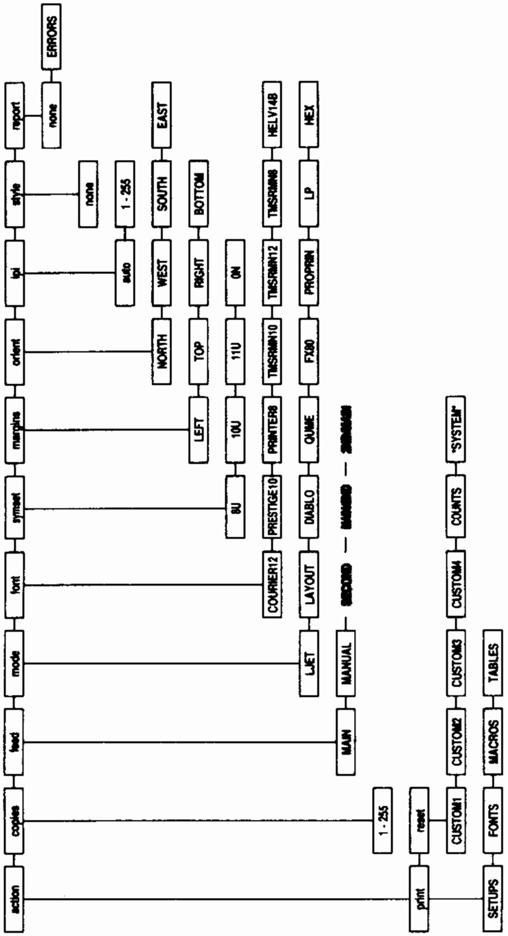
The SETUP Menu

The SETUP menu is used to set the printer's operating parameters to your exact requirements. It is likely that you will use the SETUP menu to set up the printer for use with a particular computer and not need to change the SETUP parameters again until the printer is used as a part of another system.

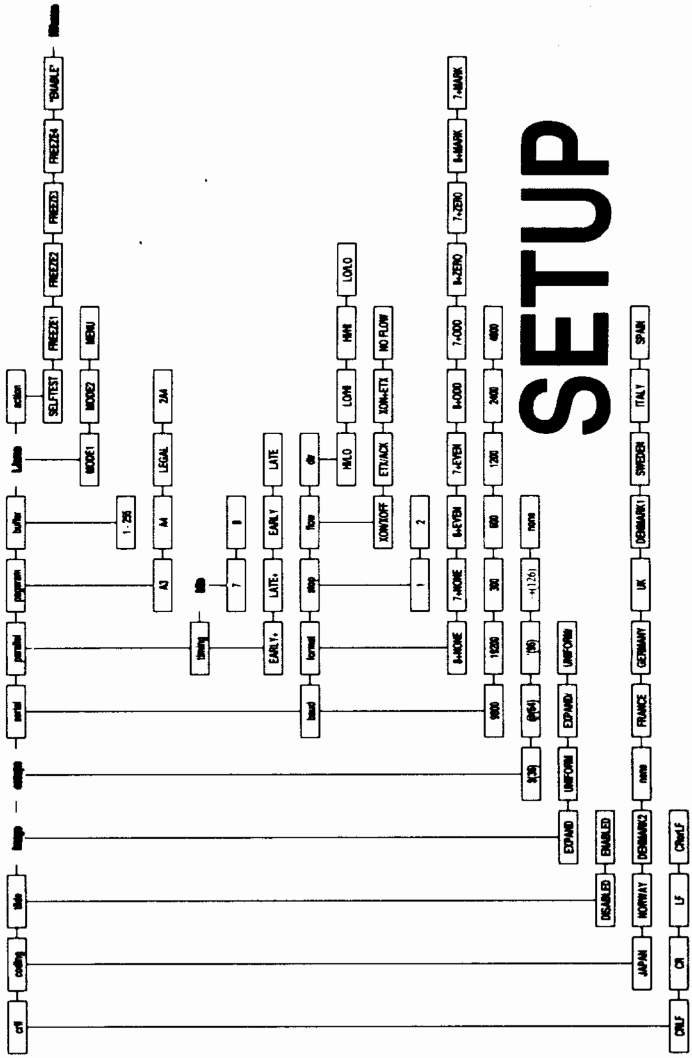
As with the SELECT menu the SETUP menu can be used in one of two ways. You can make temporary changes to the printer's operating mode that will last until the printer is switched off. Alternatively, you can change to a new default operating mode that will be stored in memory as a new default set-up for later use (see SETUP: action: FREEZE1 to FREEZE4 in chapter four).

A diagram of the SETUP menu appears over the next page.

SELECT



The SELECT menu



The SETUP menu

The items in the SETUP menu are:

- crlf
- coding
- image*
- escape*
- tilde
- serial
- parallel
- pageram
- buffer
- LJarea*
- action

* These items only appear in the SETUP menu under certain circumstances, (see chapter four for details).

Using the Menu System

This section shows you how to:

- Enter the menus
- Determine default settings
- Display and select menu options
- Reset to printer's power-up defaults

Entering the SELECT and SETUP Menus

To enter the SELECT menu:

	What you do:	What you see:
1.	Turn the printer on	The POWER indicator lights
		The CHECK and ONLINE indicators light
		The CHECK indicator goes out
	The LCD will display the date and time	`OCT 10  12:00:00`
2.	Press the ⇓ key	`SELECT |action`

We have now entered the SELECT menu. The display tells us certain things about the current position in the menu. The vertical bar that follows SELECT on the display indicates that we are at the start of a new menu, 'action', therefore, is the first item in the SELECT menu.

3. Press the ⇒ key

```
SELECT  copies
```

We are still in the SELECT menu but have moved away from the start of the menu - note that the vertical bar has now disappeared.

4. Further presses of the ⇒ key will display more items within the SELECT menu.

```
SELECT  feed
SELECT  mode
SELECT  font
SELECT  symset
SELECT  margins
SELECT  orient
SELECT  lpi
SELECT  style
SELECT  report
```

5. After the last item in the menu has been displayed, the first item reappears.

```
SELECT |action
```

6. Pressing the ⇐ key instead of the ⇒ key will allow you to move backwards in the menu rather than forwards, as above.
7. To leave the SELECT menu, press either the ⇑ key or the ONLINE key.

To enter the SETUP menu:

What you do:	What you see:
1. Turn the printer on	The POWER indicator lights
	The CHECK and ONLINE indicators light
	The CHECK indicator goes out
The LCD will display the date and time	`OCT 10  12:00:00`
2. Hold down the ⇑ key until the LCD shows:	`*SETUP*|crlf`
We have now entered the SETUP menu. The display tells us certain things about the current position in the menu. The vertical bar that follows SETUP on the display indicates that we are at the start of a new menu, 'crlf', therefore, is the first item in the SETUP menu.	
3. Press the ⇒ key	`*SETUP* coding`
We are still in the SETUP	

menu but have moved away from the start of the menu - note that the vertical bar has now disappeared.

4. Further presses of the ⇒ key will display more items within the SETUP menu.

```
*SETUP* tilde
*SETUP* serial
*SETUP* parallel
*SETUP* pageram
*SETUP* buffer
*SETUP* action
*SETUP*|crlf
```

5. After the last item in the menu has been displayed, the first item reappears.

6. Pressing the ⇐ key instead of the ⇒ key will allow you to move backwards in the menu rather than forwards, as above.

7. To leave the SETUP menu, press either the ⇑ key or the ONLINE key.

Determining Default Settings

The printer's default settings consist of all the settings saved in the printer's permanent memory. These settings are in effect when you turn the printer on.

After turning the printer on you can enter the menus as described above to find the printer's settings for such options as:

- Emulation
- Font

- Character set
- Page layout

and more.

The default settings for all other options can be checked in this way or by printing out a report sheet from within the SETUP menu (see SELECT: action: print: SETUPS in chapter four). Follow this example to determine the default typeface setting by entering the SELECT menu:

	What you do:	What you see:
1.	Turn the printer on	The POWER indicator lights
		The CHECK and ONLINE indicators light
		The CHECK indicator goes out
	The LCD will display the date and time	`OCT 10  12:00:00`
2.	Press the ⇓ key	`SELECT |action`
3.	Press the ⇒ key repeatedely until 'font' is displayed	`SELECT  font`
	The 'font' item appears in lower case letters, this indicates that there is at least one more level, below this item, that can be selected with the ⇓ key (previously we have only moved left and right in the main SELECT menu).	
4.	Press the ⇓ key	`font=COURIER12`
	This display indicates that the currently selected font is COURIER12 (12 point Courier).	
5.	Use the ⇐ and ⇒ keys to show the other fonts that	

can be selected.

font PRESTIGE10
font PRINTER8
font TMSRMN10
font TMSRMN12
font TMSRMN8
font HELV14B

Note that these messages do not have an = sign between 'font' and the font name. = indicates the font currently selected and can, therefore, only appear by one font name at a time (COURIER12 in the above example).

6. Press the ONLINE key — `OCT 12:00:34`

Displaying and Selecting Items From the Menus

It is possible to change any of the printer's default settings by entering the menu system. Follow this example to select a new default of 3 for the number of copies per document to be printed:

	What you do:	What you see:
1.	Turn the printer on	The POWER indicator lights
		The CHECK and ONLINE indicators light
		The CHECK indicator goes out
	The LCD will display the date and time	`OCT 10 12:00:00`
2.	Press the ⇓ key	`SELECT |action`
3.	Press the ⇒ key	`SELECT copies`
4.	Press the ⇓ key	`copies=1`

This tells us that the current default for number of copies per document is 1.

5. Press the ⇒ key twice

```
copies 3
```

6. Press the ⇓ key to make 3 the new default value

```
copies=3
```

7. Press the ONLINE key

```
OCT  12:00:23
```

The printer will now print three copies of any documents it receives between the default value being changed and the printer being switched off. The next time you turn the printer on, its default settings will again be in effect.

4. CHANGING PRINTER SETTINGS

Printer Settings

Introduction

This section describes everything you need to know to make regular use of this printer. The section includes details of how to change all the parameters in the two main printer menus, the SELECT and SETUP menus.

Report Printing and System Resets

The menu items in this section allow you to carry out a number of printer reset actions and print a range of reports concerning the current printer state and configuration. It is possible, for example, to return the printer to the state found after switching on. Printer reports that can be produced include listings and character tables of all resident printer fonts.

SELECT: action

When **action** is selected from the SELECT menu, a sub-menu is presented containing certain report and 'housekeeping' functions. The items in the **SELECT: action** menu are:

- print
- reset

To select **action** from the SELECT menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	`SELECT │action`
2. Press the ⇓ key This is the first item in the **action** sub-menu.	`action │print`
3. Use the ⇐ and ⇒ keys to display the remaining items in this sub-menu.	
4. Press the ONLINE key	`OCT 10  12:00:00`

SELECT: action: print

When **print** is selected from the **SELECT: action** menu, a further sub-menu is presented containing a number of functions that allow you to print report sheets detailing the current printer state. The items in the **SELECT: action: print** menu are:

- SETUPS
- FONTS
- MACROS
- TABLES

To select **print** from the **SELECT: action** menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	SELECT |action
2. Press the ⇓ key	action |print
3. Press the ⇓ key	print |SETUPS
This is the first item in the **SELECT: action: print** sub-menu.	
4. Use the ⇐ and ⇒ keys to display the remaining items in this sub-menu.	
5. Press the ONLINE key	OCT 10 12:00:00

SELECT: action: print: SETUPS

This action prints a report of the current printer status and configuration.

The report contains a list of the current print option settings such as the paper feed selected, the current emulation, the font in use and so on. Also included are details of the configuration settings such as those for the serial interface.

```
                         PRINTER SETUP REPORT

   PRINT OPTION SETTINGS               CONFIGURATION SETTINGS

copies            = 1              crlf               = CRLF
feed              = MAIN           coding             = none
mode              = LJET           tilde              = DISABLED
font              = COURIER12      serial.baud        = 9600
symset            = 8U             serial.format      = 8+NONE
margins.left      = 0.25"          serial.stop        = 1
margins.top       = 0.50"          serial.flow        = XON/XOFF
margins.right     = 0.25"          serial.dtr         = HI/LO
margins.bottom    = 0.50"          parallel.timing    = EARLY
orient            = NORTH          pageram            = A4
lpi               = auto           buffer             = 16
style             = none           LJarea             = MODEL
report            = none

                         PRINTER INFORMATION

Total page count       = 46
User page count        = 0
Paper Width            = 8.26"/210mm (2480 pixels)
Paper Height           =11.69"/297mm (3507 pixels)
Print Width            = 7.76"/197mm (2330 pixels)
Print Height           =10.69" 272mm (3207 pixels)
Secondary feed fitted  = NO
Total RAM size         = 1664 kbytes
Page RAM size          = 1027 kbytes
Free RAM size          = 534 kbytes
Characters received    = 0
Characters lost        = 0
Protocol errors        = 0
Firmware revision      = 891007
Print module status    = 00001100
                         00000001 00000001 00000001 00110001
                         00000001 00001011 00000001 00000000
                         00001000
                         00000001 00000001 00000001 00110001
                         00000001 00001011 00000001 00000000
Controller status      = 0 0 0 547464 38926 444 21
```

Printer setup report

To produce a printer setup report using **SELECT: action: print: SETUPS**, follow this sequence:

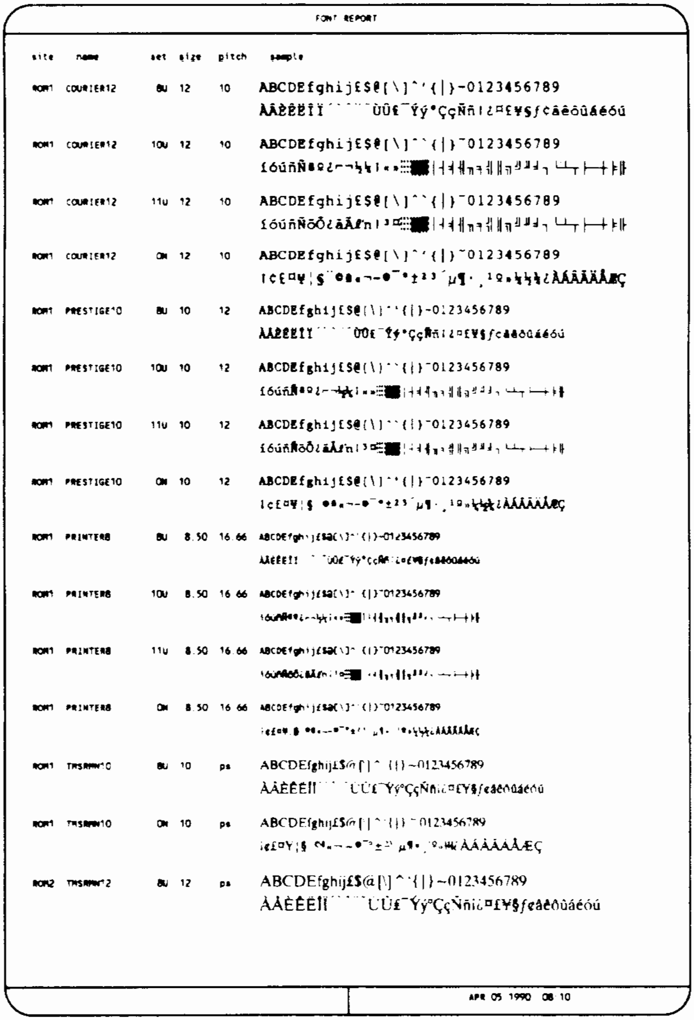
What you do:	What you see:
1. With the printer switched on, press the ⇓ key	SELECT |action
2. Press the ⇓ key	action |print
3. Press the ⇓ key	print |SETUPS
4. Press the ⇓ key	SETUPS
	SETUPS+
	SETUPS+ A4
The printer now produces the report and returns to a ready state.	OCT 10 12:00:00

SELECT: action: print: FONTS

This action prints a listing of all resident fonts and any other fonts currently available in RAM or on IC cards.

To produce a font report using **SELECT: action: print: FONTS**, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	SELECT |action
2. Press the ⇓ key	action |print
3. Press the ⇓ key	print |SETUPS
4. Press the ⇒ key	print FONTS
5. Press the ⇓ key	FONTS
	FONTS+
	FONTS+ A4
The printer now produces the report and returns to a ready state.	OCT 10 12:00:00



FONT REPORT

site	name	set	size	pitch	sample
ROM1	COURIER12	8U	12	10	ABCDEfghij£$@[\]^'{|}-0123456789
					ÀÂÈÊËÎÏ´`ˆ¨˜ÙÛ£¯Ýý°ÇçÑñ¡¿¤£¥§ƒ¢âêôûáéóú
ROM1	COURIER12	10U	12	10	ABCDEfghij£$@[\]^`{|}~0123456789
					[illegible]
ROM1	COURIER12	11U	12	10	ABCDEfghij£$@[\]^`{|}~0123456789
					[illegible]
ROM1	COURIER12	ON	12	10	ABCDEfghij£$@[\]^'{|}~0123456789
					[illegible]
ROM1	PRESTIGE10	8U	10	12	ABCDEfghij£$@[\]^'{|}-0123456789
					[illegible]
ROM1	PRESTIGE10	10U	10	12	ABCDEfghij£$@[\]^`{|}~0123456789
					[illegible]
ROM1	PRESTIGE10	11U	10	12	ABCDEfghij£$@[\]^`{|}~0123456789
					[illegible]
ROM1	PRESTIGE10	ON	10	12	ABCDEfghij£$@[\]^'{|}~0123456789
					[illegible]
ROM1	PRINTER8	8U	8.50	16.66	ABCDEfghij£$@[\]^'{|}-0123456789
					[illegible]
ROM1	PRINTER8	10U	8.50	16.66	ABCDEfghij£$@[\]^`{|}~0123456789
					[illegible]
ROM1	PRINTER8	11U	8.50	16.66	ABCDEfghij£$@[\]^`{|}~0123456789
					[illegible]
ROM1	PRINTER8	ON	8.50	16.66	ABCDEfghij£$@[\]^'{|}~0123456789
					[illegible]
ROM1	TMSRMN10	8U	10	ps	ABCDEfghij£$@[\]^'{|}~0123456789
					ÀÂÈÊËÎÏ´`ˆ¨˜ÙÛ£¯Ýý°ÇçÑñ¡¿¤£¥§ƒ¢âêôûáéóú
ROM1	TMSRMN10	ON	10	ps	ABCDEfghij£$@[\]^'{|}~0123456789
					[illegible]
ROM2	TMSRMN12	8U	12	ps	ABCDEfghij£$@[\]^'{|}~0123456789
					ÀÂÈÊËÎÏ´`ˆ¨˜ÙÛ£¯Ýý°ÇçÑñ¡¿¤£¥§ƒ¢âêôûáéóú

APR 05 1990 08:10

Printer font report

SELECT: action: print: MACROS

The MACROS feature is not currently implemented.

SELECT: action: print: TABLES

This action prints character code tables for all resident fonts and any other fonts currently available in RAM or on font cards. The tables are produced using the currently selected **SETUP: coding** and **SELECT: symset** settings (see later in this chapter).

To produce character code tables using **SELECT: action: print: TABLES**, follow this sequence:

	What you do:	What you see:
1.	With the printer switched on, press the ⇓ key	`SELECT │action`
2.	Press the ⇓ key	`action │print`
3.	Press the ⇓ key	`print │SETUPS`
4.	Press the ⇒ key three times	`print TABLES`
5.	Press the ⇓ key	`TABLES`
		`TABLES+`
		`TABLES+ A4`
	The last three displays, shown opposite, are repeated until character code tables have been printed for all fonts. The printer then returns to a ready state.	`OCT 10 12:00:00`

SELECT: action: reset

When **reset** is selected from the **SELECT: action** menu, a further sub-menu is presented containing a number of functions for resetting the printer state configuration. The items in the **SELECT: action: reset** menu are:

- CUSTOM1
- CUSTOM2
- CUSTOM3
- CUSTOM4
- COUNTS
- *SYSTEM*

To select **reset** from the **SELECT: action** menu, follow this sequence:

	What you do:	What you see:
1.	With the printer switched on, press the ⇓ key	`SELECT |action`
2.	Press the ⇓ key	`action |print`
3.	Press the ⇒ key	`action reset`
4.	Press the ⇓ key This is the first item in the **SELECT: action: reset** sub-menu.	`reset |CUSTOM1`
5.	Use the ⇐ and ⇒ keys to display the remaining items in this sub-menu.	

SELECT: action: reset: CUSTOM1 to 4

CUSTOM1 to 4 are the names of previously saved printer configurations. These allow you to restore up to four previous configurations. You may, for example, require a certain printer configuration for a particular type of work. You can configure the printer to these requirements with a single selection rather than having to change a number of options.

For information on saving a printer configuration for later use, see **SETUP: action: FREEZE1 to 4**.

To restore a previously saved configuration using **SELECT: action: reset: CUSTOM1 to 4**, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	`SELECT |action`
2. Press the ⇓ key	`action |print`
3. Press the ⇒ key	`action reset`
4. Press the ⇓ key	`reset |CUSTOM1`
5. Press the ⇒ key until the required configuration is displayed	`reset |CUSTOM4`
6. Press the ⇓ key	`CUSTOM4`
The printer restores the selected configuration stored in CUSTOM and returns to a ready state.	`OCT 10 12:00:00`

SELECT: action: reset: COUNTS

This option zeros the user page count, the protocol error count and the received character count.

To reset printer counters using **SELECT: action: reset: COUNTS**, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	`SELECT |action`
2. Press the ⇓ key	`action |print`
3. Press the ⇒ key	`action reset`
4. Press the ⇓ key	`reset |CUSTOM`
5. Press the ⇒ key	`reset COUNTS`
6. Press the ⇓ key	`COUNTS`
The printer resets the printer counters and returns to a ready state.	`OCT 10 12:00:00`

SELECT: action: reset: *SYSTEM*

This action causes a complete system reset. The printer reverts to the same state that would follow switching on the machine. All configurations that have not been permanently saved using **SETUP: action: FREEZE1 to 4** (see later in this chapter) will be cancelled. All down-loaded fonts and macros will also be cancelled.

To cause a complete system reset using **SELECT: action: reset: *SYSTEM***, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	`SELECT |action`
2. Press the ⇓ key	`action |print`
3. Press the ⇒ key	`action reset`
4. Press the ⇓ key	`reset |CUSTOM1`
5. Press the ⇒ five times	`reset *SYSTEM*`
6. Press the ⇓ key	`*SYSTEM*`
The printer carries out a complete system reset and returns to a ready state.	`OCT 10 12:00:00`

Setting the Number of Copies Printed

This section tells you how to set the number of copies of each document that the printer will produce. For example, the printer can be set to automatically print three copies of each document it receives.

SELECT: copies

The **copies** option in the SELECT menu sets the number of copies printed of each page. The maximum is 255 copies per page.

To change the number of copies printed per page, follow this

sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	`SELECT |action`
2. Press the ⇒ key	`SELECT copies`
3. Press the ⇓ key	`copies=1`
This shows the number of copies per page currently set.	
Note that 1 is the factory setting of the copies parameter.	
4. Assuming the number of copies to be printed is 5, press the ⇒ key repeatedly until 5 is displayed	`copies 5`
Note that while the ⇒ key increases the number of copies, the ⇐ key reduces it.	
5. To set 5 as the number of copies, press the ⇓ key	`copies=5`
The = sign indicates that 5 has been set.	
6. Press the ONLINE key	`OCT 10 12:00:00`

The printer will now print five copies of all documents it receives until the **SELECT: copies** action is reset or until the printer is switched off.

Choosing Paper Feeds

This section tells you how to select from the available paper sources that the printer supports. This includes the manual paper slot for single sheet feeding and use of optional second cassette

if it is fitted.

Using the Paper Feeds

When both cassettes are fitted to the printer, they may be used for different types of paper. For example, you could load the first cassette with headed paper and the second cassette with continuation sheets (see your programmer's manual for details of the appropriate commands for alternating between cassette 1 and cassette 2).

Manual Feed Slot

Cassette 1 has a manual feed slot which can be used to feed paper manually.

The manual paper feed slot can be selected either from the front panel (see below), or from commands embedded into data sent to the printer (see your programmer's manual for full details of the appropriate commands).

When the printer requires paper to be loaded into the manual feed slot, A4 for example, the following message will be displayed:

```
*MANUAL    A4
```

When this message is displayed, insert a sheet of paper of the correct size, A4 in this example, and press the CONTINUE key.

SELECT: feed

This item in the SELECT menu allows you to select from the available paper feeds. When you select **feed** from the SELECT menu, a sub-menu is presented containing the following paper feed options:

- MAIN
- MANUAL
- SECOND
- MAIN/2ND
- 2ND/MAIN

To select **feed** from the SELECT menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	`SELECT |action`
2. Press the ⇒ key twice	`SELECT feed`
3. Press the ⇓ key	`feed=MAIN`
This is the first item in the **feed** sub-menu.	
4. Use the ⇐ and ⇒ keys to display the remaining items in this sub-menu.	
5. Press the ONLINE key	`OCT 10 12:00:00`

SELECT: feed: MAIN

This action sets cassette 1 as the paper feed source. To select **MAIN** from the **SELECT: feed** menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	`SELECT |action`
2. Press the ⇒ key twice	`SELECT feed`
3. Press the ⇓ key	`feed=MAIN`
In this example, the display already shows **MAIN** as the setting selected (as indicated by the = sign).	
Note that **MAIN** is the factory setting for the paper feed parameter.	
4. If **MAIN** is already set as the paper feed source, press the ONLINE key	`OCT 10 12:00:00`

if not, use the ⇐ and ⇒ keys until **MAIN** is displayed and press the ⇓ key	`feed=MAIN`
and then press the ONLINE key	`OCT 10 12:00:00`

SELECT: feed: MANUAL

This action allows you to instruct the printer to use the manual paper feed on the top of cassette 1. To select **MANUAL** from the **SELECT: feed** menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	`SELECT |action`
2. Press the ⇒ key twice	`SELECT feed`
3. Press the ⇓ key	`feed=MAIN`
4. Press the ⇒ key	`feed MANUAL`
5. Press the ⇓ key	`feed=MANUAL`
6. Press the ONLINE key	`OCT 10 12:00:00`

SELECT: feed: SECOND

This action sets cassette 2, if fitted, as the paper feed source. To select **SECOND** from the **SELECT: feed** menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	`SELECT |action`
2. Press the ⇒ key twice	`SELECT feed`
3. Press the ⇓ key	`feed=MAIN`
4. Press the ⇒ key twice	`feed SECOND`
5. Press the ⇓ key	`feed=SECOND`
6. Press the ONLINE key	`OCT 10 12:00:00`

SELECT: feed: MAIN/2ND

This action sets cassette 1 as the primary paper feed source and cassette 2 as the secondary. The printer will use the paper supply in cassette 1 until it is exhausted and then switch to the paper supply in cassette 2.

Note that this option only appears in the **SELECT: feed** menu if the optional, second cassette is fitted. To select **MAIN/2ND** from the **SELECT: feed** menu, follow this sequence:

	What you do:	**What you see:**
1.	With the printer switched on, press the ⇓ key	`SELECT |action`
2.	Press the ⇒ key twice	`SELECT feed`
3.	Press the ⇓ key	`feed=MAIN`
4.	Press the ⇒ key three times	`feed MAIN/2ND`
5.	Press the ⇓ key	`feed=MAIN/2ND`
6.	Press the ONLINE key	`OCT 10 12:00:00`

SELECT: feed: 2ND/MAIN

This action sets cassette 2 as the primary paper feed source and cassette 1 as the secondary. The printer will use the paper supply in cassette 2 until it is exhausted and then switch to the paper supply in cassette 1.

Note that this option only appears in the **SELECT: feed** menu if the optional, second cassette is fitted. To select **2ND/MAIN** from the **SELECT: feed** menu, follow this sequence:

	What you do:	**What you see:**
1.	With the printer switched on, press the ⇓ key	`SELECT |action`
2.	Press the ⇒ key twice	`SELECT feed`
3.	Press the ⇓ key	`feed=MAIN`
4.	Press the ⇒ key four times	`feed 2ND/MAIN`

5. Press the ⇓ key — `feed=2ND/MAIN`

6. Press the ONLINE key — `OCT 10   12:00:00`

Selecting an Emulation

The printer has a number of built-in emulations. These allow it to 'emulate' a number of other printers, behaving exactly as if it were the emulated printer. The printer understands all control codes and command that the other printer uses. This section lists the emulations supported by the printer and tells you how to select the emulation you require.

SELECT: mode

This item in the SELECT menu allows you to select from the emulations that the printer supports. Additionally, you can instruct the printer to operate in LAYOUT mode (LAYOUT is a Document Description Language or DDL) and the printer will produce a hexadecimal and ASCII printout of the incoming data stream when operating in HEX mode. When you select **mode** from the SELECT menu, a sub-menu is presented containing the following emulation options:

- LJET
- LAYOUT
- DIABLO
- QUME
- FX80
- PROPRIN
- LP
- HEX

To select **mode** from the SELECT menu, follow this sequence:

	What you do:	**What you see:**
1.	With the printer switched on, press the ⇓ key	`SELECT |action`
2.	Press the ⇒ key three times	`SELECT  mode`

3. Press the ⇓ key — `feed=LJET`

   This is the first item in the **mode** sub-menu.

4. Use the ⇐ and ⇒ keys to display the remaining items in this sub-menu.

5. Press the ONLINE key — `OCT 10  12:00:00`

SELECT: mode: LJET

This action instructs the printer to emulate the Hewlett Packard LaserJet printer. All LaserJet modes and commands are available with the addition of a number of other facilities not available on that printer. For a full list of the LaserJet commands and control codes, refer to appendix H and your programmer's manual.

To select LaserJet emulation, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	`SELECT |action`
2. Press the ⇒ key three times	`SELECT  mode`
3. Press the ⇓ key	`mode=LJET`
In this example, the display already shows **LJET** as the emulation selected (as indicated by the = sign).	
Note that **LJET** is the factory setting for the printer emulation parameter.	
4. If **LJET** is selected as the printer emulation, press the ONLINE key	`OCT 10  12:00:00`

if not, use the ⇐ and ⇒ keys until **LJET** is displayed and press the ⇓ key	`mode=LJET`
Press the ONLINE key	`OCT 10  12:00:00`

SELECT: mode: LAYOUT

This action offers the use of the LAYOUT document description language (DDL). LAYOUT offers a wide range of printer control, text formatting, page formatting and graphics facilities. A more complete description of LAYOUT is provided in your programmer's manual.

To select LAYOUT mode, follow this sequence:

What you do:	**What you see:**
1. With the printer switched on, press the ⇓ key	`SELECT │action`
2. Press the ⇒ key three times	`SELECT  mode`
3. Press the ⇓ key	`mode=LJET`
4. Press the ⇒ key	`mode LAYOUT`
5. Press the ⇓ key	`mode=LAYOUT`
6. Press the ONLINE key	`OCT 10  12:00:00`

SELECT: mode: DIABLO

This action instructs the printer to emulate the Diablo 630 printer. All Diablo 630 modes and commands are available with the addition of a number of other facilities not available on that printer. For a full list of the Diablo 630 commands and control codes, refer to appendix H and your programmer's manual.

To select Diablo emulation, follow this sequence:

What you do:	**What you see:**
1. With the printer switched on, press the ⇓ key	`SELECT │action`

2. Press the ⇒ key three times	`SELECT mode`
3. Press the ⇓ key	`mode=LJET`
4. Press the ⇒ key twice	`mode DIABLO`
5. Press the ⇓ key	`mode=DIABLO`
6. Press the ONLINE key	`OCT 10 12:00:00`

SELECT: mode: QUME

This action instructs the printer to emulate the Qume Sprint 11 printer. All Qume Sprint 11 modes and commands are available with the addition of a number of other facilities not available on that printer. For a full list of the Qume Sprint 11 commands and control codes, refer to appendix H and your programmer's manual.

To select Qume Sprint 11 emulation, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	`SELECT |action`
2. Press the ⇒ key three times	`SELECT mode`
3. Press the ⇓ key	`mode=LJET`
4. Press the ⇒ key three times	`mode QUME`
5. Press the ⇓ key	`mode=QUME`
6. Press the ONLINE key	`OCT 10 12:00:00`

SELECT: mode: FX80

This action instructs the printer to emulate the Epson FX-80 dot matrix printer. All Epson FX-80 modes and commands are available with the addition of a number of other facilities not available on that printer. For a full list of the Epson FX-80 commands and control codes, refer to your programmer's manual.

To select Epson FX-80 emulation, follow this sequence:

	What you do:	What you see:
1.	With the printer switched on, press the ⇓ key	`SELECT |action`
2.	Press the ⇒ key three times	`SELECT mode`
3.	Press the ⇓ key	`mode=LJET`
4.	Press the ⇒ key four times	`mode FX80`
5.	Press the ⇓ key	`mode=FX80`
6.	Press the ONLINE key	`OCT 10 12:00:00`

SELECT: action: PROPRIN

This action instructs the printer to emulate the IBM Proprinter. All Proprinter modes and commands are available with the addition of a number of other facilities not available on that printer. For a full list of the Proprinter commands and control codes, refer to appendix H and your programmer's manual.

To select Proprinter emulation, follow this sequence:

	What you do:	What you see:
1.	With the printer switched on, press the ⇓ key	`SELECT |action`
2.	Press the ⇒ key three times	`SELECT mode`
3.	Press the ⇓ key	`mode=LJET`
4.	Press the ⇒ key five times	`mode PROPRIN`
5.	Press the ⇓ key	`mode=PROPRIN`
6.	Press the ONLINE key	`OCT 10 12:00:00`

SELECT: mode: LP

This action instructs the printer to emulate the Fujitsu M304X Line Printer. For a full list of the Line Printer commands and control codes, refer to appendix H and your programmer's manual. To

select Fujitsu M304X Line Printer emulation, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	`SELECT ¦action`
2. Press the ⇒ key three times	`SELECT mode`
3. Press the ⇓ key	`mode=LJET`
4. Press the ⇒ key six times	`mode LP`
5. Press the ⇓ key	`mode=LP`
6. Press the ONLINE key	`OCT 10 12:00:00`

SELECT: mode: HEX

This action instructs the printer to produce a hexadecimal and ASCII file dump of the incoming data stream.

Here is an example of such a file dump of part of the nursery rhyme, Mary had a little Lamb:

```
000000:  4D 61 72 79 20 68 61 64 20 61 20 6C 69 74 74 6C  Mary had a littl
000010:  65 20 6C 61 6D 62 0D 0A 57 68 6F 73 65 20 66 6C  e lamb..Whose fl
000020:  65 65 63 65 20 77 61 73 20 77 68 69 74 65 20 61  eece was white a
000030:  73 20 73 6E 6F 77 0D 0A 41 6E 64 20 65 76 65 72  s snow..And ever
000040:  79 77 68 65 72 65 20 74 68 61 74 20 4D 61 72 79  ywhere that Mary
000050:  20 77 65 6E 74 0D 0A 54 68 65 20 6C 61 6D 62 20   went..The lamb
000060:  77 61 73 20 73 75 72 65 20 74 6F 20 67 6F 2E 1A  was sure to go..
```

HEX and ASCII file dump

To select HEX mode, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	`SELECT ¦action`
2. Press the ⇒ key three times	`SELECT mode`
3. Press the ⇓ key	`mode=LJET`
4. Press the ⇒ key seven times	`mode HEX`
5. Press the ⇓ key	`mode=HEX`

Printer Settings

6. Press the ONLINE key	`OCT 10 12:00:00`

Selecting a Font

This section lists all of the printer's resident fonts and tells you how to select these and other fonts from IC cards for printing.

SELECT: font

This item in the SELECT menu allows you to select from the printer's resident fonts. Additionally, any fonts stored on IC cards currently installed in the printer can also be accessed through this action. When you select **font** from the SELECT menu, a sub-menu is presented containing the following font options:

- COURIER12
- PRESTIGE10
- PRINTER8
- TMSRMN10
- TMSRMN12
- TMSRMN8
- HELV14B

To select **font** from the SELECT menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	`SELECT |action`
2. Press the ⇒ key four times	`SELECT font`
3. Press the ⇓ key This is the first item in the **font** sub-menu.	`font=COURIER12`
4. Use the ⇐ and ⇒ keys to display the remaining items in this sub-menu.	
5. Press the ONLINE key	`OCT 10 12:00:00`

SELECT: font: COURIER12

This action selects COURIER12 from the available fonts, as the current printer font, ie all subsequent documents will be printed in the typeface 'Courier' at a size of 12 points.

To select COURIER12, follow this sequence:

	What you do:	What you see:
1.	With the printer switched on, press the ⇓ key	`SELECT |action`
2.	Press the ⇒ key four times	`SELECT  font`
3.	Press the ⇓ key	`font=COURIER12`
	In this example, the display already shows **COURIER12** as the current printer font (as indicated by the = sign).	
	Note that **COURIER12** is the factory setting for the printer font parameter.	
4.	If **COURIER12** is selected as the current printer font, press the ONLINE key	`OCT 10  12:00:00`
	if not, use the ⇐ and ⇒ keys until **COURIER12** is displayed and press the ⇓ key	`font=COURIER12`
	and then press the ONLINE key	`OCT 10  12:00:00`

SELECT: font: PRESTIGE10

This action selects PRESTIGE10 from the available fonts, as the current printer font, ie all subsequent documents will be printed in the typeface 'Prestige' at a size of 10 points.

To select PRESTIGE10, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	SELECT |action
2. Press the ⇒ key four times	SELECT font
3. Press the ⇓ key	font=COURIER12
4. Press the ⇒ key	font PRESTIGE10
5. Press the ⇓ key	font=PRESTIGE10
6. Press the ONLINE key	OCT 10 12:00:00

SELECT: font: PRINTER8

This action selects PRINTER8 from the available fonts, as the current printer font, ie all subsequent documents will be printed in the typeface 'Printer' at a size of 8 points.

To select PRINTER8, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	SELECT |action
2. Press the ⇒ key four times	SELECT font
3. Press the ⇓ key	font=COURIER12
4. Press the ⇒ key twice	font PRINTER8
5. Press the ⇓ key	font=PRINTER8
6. Press the ONLINE key	OCT 10 12:00:00

SELECT: font: TMSRMN10

This action selects TMSRMN10 from the available fonts, as the current printer font, ie all subsequent documents will be printed in the typeface 'Dutch' at a size of 10 points.

To select TMSRMN10, follow this sequence:

	What you do:	What you see:
1.	With the printer switched on, press the ⇓ key	`SELECT |action`
2.	Press the ⇒ key four times	`SELECT font`
3.	Press the ⇓ key	`font=COURIER12`
4.	Press the ⇒ key three times	`font TMSRMN10`
5.	Press the ⇓ key	`font=TMSRMN10`
6.	Press the ONLINE key	`OCT 10 12:00:00`

SELECT: font: TMSRMN12

This action selects TMSRMN12 from the available fonts, as the current printer font, ie all subsequent documents will be printed in the typeface 'Dutch' at a size of 12 points.

To select TMSRMN12, follow this sequence:

	What you do:	What you see:
1.	With the printer switched on, press the ⇓ key	`SELECT |action`
2.	Press the ⇒ key four times	`SELECT font`
3.	Press the ⇓ key	`font=COURIER12`
4.	Press the ⇒ key four times	`font TMSRMN12`
5.	Press the ⇓ key	`font=TMSRMN12`
6.	Press the ONLINE key	`OCT 10 12:00:00`

SELECT: font: TMSRMN8

This action selects TMSRMN8 from the available fonts, as the current printer font, ie all subsequent documents will be printed in the typeface 'Dutch' at a size of 8 points.

To select TMSRMN8, follow this sequence:

	What you do:	What you see:
1.	With the printer switched on, press the ⇓ key	SELECT |action
2.	Press the ⇒ key four times	SELECT font
3.	Press the ⇓ key	font=COURIER12
4.	Press the ⇒ key five times	font TMSRMN8
5.	Press the ⇓ key	font=TMSRMN8
6.	Press the ONLINE key	OCT 10 12:00:00

SELECT: font: HELV14B

This action selects HELV14B from the available fonts, as the current printer font, ie all subsequent documents will be printed in the typeface 'Swiss Bold' at a size of 14 points.

To select HELV14B, follow this sequence:

	What you do:	What you see:
1.	With the printer switched on, press the ⇓ key	SELECT |action
2.	Press the ⇒ key four times	SELECT font
3.	Press the ⇓ key	font=COURIER12
4.	Press the ⇒ key six times	font HELV14B
5.	Press the ⇓ key	font=HELV14B
6.	Press the ONLINE key	OCT 10 12:00:00

Selecting a Symbol Set

The basic fonts listed in the section above have a number of national variations to suit the conventions of a particular language or country.

This sections lists some of the symbol sets available and tells you how to select them.

SELECT: symset

This item in the SELECT menu allows you to select from the available 'symsets' or symbol sets available for the currently selected font (see SELECT: font). When selected, **SELECT: symset** presents a sub-menu of the available options.

Assuming that the currently selected font is PRINTER8, the sub-menu would contain the items:

- 8U
- 10U
- 11U
- 0N

To select **symset** from the SELECT menu, follow this sequence:

	What you do:	What you see:
1.	With the printer switched on, press the ⇓ key	`SELECT ∣action`
2.	Press the ⇒ key five times	`SELECT symset`
3.	Press the ⇓ key By default this is the first item in the **symset** sub-menu when **PRINTER8** is the font currently selected under **SELECT: font**.	`symset=8U`
4.	Use the ⇐ and ⇒ keys to display the remaining items in this sub-menu.	
5.	If you want to change to another of the available symbol sets, **10U** for example, use the ⇐ and ⇒ keys until **10U** is displayed	`symset 10U`
6.	Press the ⇓ key to select **10U** as the symbol set to be used	`symset=10U`
7.	Press the ONLINE key	`OCT 10 12:00:00`

Printer Settings

Setting Page Format

This section details the various parameters that can be set to affect the layout, or format, of the final printed documents produced by the printer. Width of margins, lines of text per inch and so on, can all be set using the instructions in this section.

SELECT: margins

This item in the SELECT menu allows you to set the four page margins to your exact requirements. Each of the four margins can be set in increments of 0.01 inches.

When you select **margins** from the SELECT menu, a sub-menu is presented containing the following options:

- left
- top
- right
- bottom

To select **margins** from the SELECT menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	`SELECT |action`
2. Press the ⇒ key six times	`SELECT margins`
3. Press the ⇓ key This is the first item in the **margins** sub-menu.	`margins|left`
4. Use the ⇐ and ⇒ keys to display the remaining items in this sub-menu.	

To change any of the page margin settings, follow this example where the bottom margin will be set to one inch:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	`SELECT |action`

2. Press the ⇒ key six times	`SELECT margins`
3. Press the ⇓ key	`margins|left`
4. Press the ⇒ key three times	`margins bottom`
5. Press the ⇓ key The bottom margin is currently set to 50 (0.5 inches).	`bottom=50`
6. Press the ⇒ key and hold it down until the LCD displays 100	`margins 100`
7. Press the ⇓ key to set 100 as the new bottom margin value	

The bottom margin will now be set to one inch instead of the previous 0.5 inches.

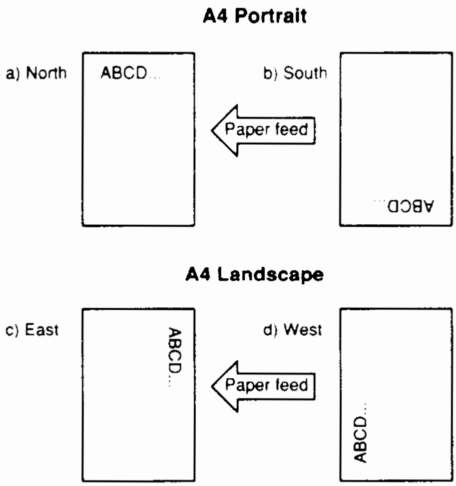
The factory default settings for the margin parameters are as follows:

Margin:	**Default Value:**
Left	25 (0.25 inches)
Top	50 (0.5 inches)
Right	25 (0.25 inches)
Bottom	50 (0.5 inches)

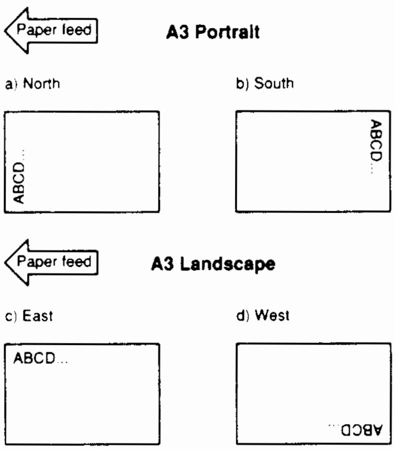
SELECT: orient

This item in the SELECT menu allows you to set the orientation of the printed page.

When you select **orient** from the SELECT menu, a sub-menu is presented containing the following options:



A4 page orientation



A3 page orientation

- NORTH
- WEST
- SOUTH
- EAST

To select **orient** from the SELECT menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	`SELECT |action`
2. Press the ⇒ key seven times	`SELECT  orient`
3. Press the ⇓ key	`orient=NORTH`
Note that **NORTH** is the factory setting for the page orientation parameter.	
4. Use the ⇐ and ⇒ keys to display the remaining items in this sub-menu.	
5. If you want to change to another of the available page orientations, **WEST** for example, press the ⇒ key	`orient WEST`
6. Press the ⇓ key	`orient=WEST`
7. Press the ONLINE key	`OCT 10  12:00:00`

Any documents that the printer now receives will be printed in landscape orientation rather than portrait.

SELECT: lpi

This item in the SELECT menu allows you to specify the number of printed lines of text per document inch (lpi). The maximum lines per inch setting is 255. Such a setting is, of course, of little use.

To select **lpi** from the SELECT menu and change the parameter

to a new value, follow this sequence:

	What you do:	What you see:
1.	With the printer switched on, press the ⇓ key	SELECT |action
2.	Press the ⇒ key eight times	SELECT lpi
3.	Press the ⇓ key Note that **auto** is the factory setting for the lines per inch parameter. When set to **auto** the printer will use the default lpi value for the currently selected emulation or the value determined by the currently selected font.	lpi=auto
4.	Assuming that you wish your final document to have four lines of text per inch press the ⇒ key repeatedly until 4 is displayed. Note that while the ⇒ key increases the number of line per inch, the ⇐ key reduces it.	lpi 4
5.	To set **4** as the number of lines per inch, press the ⇓ key. The = sign indicates that 4 has been set.	lpi=4
6.	Press the ONLINE key	OCT 10 12:00:00

The printer will now print four lines of text per inch on all documents until the **SELECT: lpi** parameter is reset or until the printer is switched off.

SELECT: style

The style option is not currently implemented.

Error Reports

Normally, the printer will not produce a list of any protocol errors that occur during printing. The printer can be set to do so, however, by following the instructions in this section. After enabling this feature, if any protocol errors occur during the printing of a document, the printer will produce a list of these errors after the document has been printed

SELECT: report

This item in the SELECT menu allows you to set the printer to print a report of any protocol (mode) errors that may occur during the printing of each document. If any errors occur, the printer will produce a report after the main document has been printed.

When you select **report** from the SELECT menu, a sub-menu is presented containing the following options:

- none
- ERRORS

To select **orient** from the SELECT menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press the ⇓ key	`SELECT |action`
2. Press the ⇒ key ten times	`SELECT report`
3. Press the ⇓ key Note that **none** is the factory setting for the error report parameter.	`report=none`
4. If you wish to set the printer to produce error reports when appropriate, press the ⇒ key	`report ERRORS`

5. Press the ⇓ key to enable the **ERRORS** option

```
report=ERRORS
```

6. Press the ONLINE key

```
OCT 10  12:00:00
```

Now, if any errors have occurred, the printer will produce an error report after printing the main document.

Customising the Printer

All of the changes to the printer set-up so far described can be permanently saved but some of them are also likely to be carried out on a day to day basis. The options listed in this section, however, concern printer settings that will most likely be set and stored as the permanent printer configuration. Most of these options set the printer configuration to suit a particular host computer or network. Once set, they may not need to be changed until the printer is used as a part of another system.

This section covers all of the available options in the SETUP menu.

SETUP: crlf

Your host computer or application software may send, at the end of each line of text, a carriage return character (CR), a line feed character (LF), or both. In any case, the printer must know what to expect from the host in order to avoid either double-line spacing or all lines of text being printed on top of one another. This option in the SETUP menu allows you to select the correct operating mode on the printer to comply with your computer and/or software.

When **crlf** is selected from the SETUP menu, a sub-menu is presented containing the following options:

- CRLF
- CR
- LF
- CRorLF

To select **crlf** from the SETUP menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇓ key	`crlf=CRLF`
This is the first item in the **crlf** sub-menu.	
3. Use the ⇐ and ⇒ keys to display the remaining items in this sub-menu.	
4. Press the ONLINE key	`OCT 10  12:00:00`

SETUP: crlf: CRLF

This action, when selected, causes the printer to expect the host computer to send both a carriage return (CR) character and a line feed (LF) character at the end of each line of text. In other words, data from the host will be processed literally, all line feed and carriage return characters will be used by the printer.

To select **CRLF** from the **SETUP: crlf** sub-menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇓ key	`crlf=CRLF`
In this example, the display already shows **CRLF** as the setting selected (as indicated by the = sign).	
Note that **CRLF** is the factory setting for this parameter.	

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3. If **CRLF** is already selected, press the ONLINE key	`OCT 10  12:00:00`
If not, use the ⇐ and ⇒ keys until **CRLF** is displayed	`crlf CRLF`
press the ⇓ key	`crlf=CRLF  ·`
and then press the ONLINE key	`OCT 10  12:00:00`

SETUP: crlf: CR

This action, when selected, causes the printer to interpret a carriage return character as both a carriage return and a line feed. So, if your host computer sends only a carriage return at the end of a line of text the printer will also perform a line feed.

To select **CR** from the **SETUP: crlf** sub-menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇓ key	`crlf=CRLF`
3. Press the ⇒ key	`crlf CR`
4. Press the ⇓ key	`crlf=CR`
5. Press the ONLINE key	`OCT 10  12:00:00`

SETUP: crlf: LF

This action, when selected, causes the printer to interpret a line feed character as both a carriage return and a line feed. So, if your host computer sends only a line feed at the end of a line of text the printer will also perform a carriage return.

To select **LF** from the **SETUP: crlf** sub-menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇓ key	`crlf=CRLF`
3. Press the ⇒ key twice	`crlf LF`
4. Press the ⇓ key	`crlf=LF`
5. Press the ONLINE key	`OCT 10  12:00:00`

SETUP: crlf: CRorLF

This action causes the printer to perform a carriage return and a line feed each time it receives either a carriage return character or a line feed character.

To select **CRorLF** from the **SETUP: crlf** sub-menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇓ key	`crlf=CRLF`
3. Press the ⇒ key three times	`crlf CRorLF`
4. Press the ⇓ key	`crlf=CRorLF`
5. Press the ONLINE key	`OCT 10  12:00:00`

SETUP: coding

This item in the SETUP menu allows you to select a national variant of the standard character set currently selected.

When **coding** is selected from the SETUP menu, a sub-menu is presented containing the following items:

- JAPAN
- NORWAY
- DENMARK2
- none
- FRANCE
- GERMANY
- UK
- DENMARK1
- SWEDEN
- ITALY
- SPAIN

To select **coding** from the SETUP menu and select one of the national coding variants, for example **SPAIN**, follow this sequence:

	What you do:	**What you see:**
1.	With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2.	Press the ⇒ key	`*SETUP* coding`
3.	Press the ⇓ key This is the first item in the **coding** sub-menu. Note that **none** is the factory setting for this parameter. When selected, no special coding is used for accessing text characters in fonts. The basic symbol set will be used.	`coding=none`
4.	To select **SPAIN** from the **SETUP: coding** menu, press the ⇒ key seven times	`coding SPAIN`

5. Press the ⇓ key — `coding=SPAIN`
6. Press the ONLINE key — `OCT 10  12:00:00`

SETUP: tilde

This item in the SETUP menu allows users who are unable to send, for example, an ESC ESC BEL sequence to the printer to use the sequence tilde tilde circumflex (~~^). When this option is enabled, the printer will treat the tilde (~) as the ESC character and the circumflex (^) as the BEL character.

When **tilde** is selected from the SETUP menu, a sub-menu containing the following items is presented.

- DISABLED
- ENABLED

To select **tilde** from the SETUP menu and enable the option, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **tilde** is displayed	`*SETUP* tilde`
3. Press the ⇓ key	`tilde=DISABLED`

This is the first item in the **tilde** sub-menu.

Note that **DISABLED** is the factory setting for this parameter. When disabled, the printer will not allow substitution of tilde tilde circumflex (~~^) for ESC ESC BEL.

4. To select **ENABLE** from the **SETUP: tilde** menu, thereby enabling substitution, press the ⇒ key	`tilde ENABLED`
5. Press the ⇓ key to enable substitution	`tilde=ENABLED`
6. Press the ONLINE key	`OCT 10  12:00:00`

SETUP: image

This item in the SETUP menu only appears when one of the dot-matrix printer emulations (FX80 or PROPRIN) is selected under **SELECT: mode** (see earlier in this chapter).

When **image** is selected from the SETUP menu, a sub-menu is presented containing the following items:

- EXPAND
- UNIFORM
- EXPAND/
- UNIFORM/

The four options define the way in which images are to be printed and the use of italic fonts.

To select **image** from the SETUP menu, follow this sequence:

What you do:	**What you see:**
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **image** is displayed	`*SETUP* image`
3. Press the ⇓ key This is the first item in the **image** sub-menu.	`image=EXPAND`

4. Use the ⇐ and ⇒ keys to display the remaining items in this sub-menu.
5. Press the ONLINE key — `OCT 10  12:00:00`

SETUP: image: EXPAND

The **EXPAND** option causes the horizontal distance between the dots of the graphic image to be periodically readjusted to cancel the effect of resolution differences between this printer and the printer emulated.

To select **EXPAND** from the **SETUP: image** menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **image** is displayed	`*SETUP* image`
3. Press the ⇓ key	`image=EXPAND`
This is the first item in the **image** sub-menu and is currently selected (as indicated by the = sign).	
4. If **EXPAND** is already selected, press the ONLINE key	`OCT 10  12:00:00`
if not, press the ⇒ key to display **EXPAND**	`image EXPAND`
press the ⇓ key	`image=EXPAND`
and then press the ONLINE key	`OCT 10  12:00:00`

SETUP: image: UNIFORM

The **UNIFORM** option causes the printer to print bit-map graphic images exactly as they are received from the host computer with no adjustment to the horizontal spacing of the dots.

To select **UNIFORM** from the **SETUP: image** menu, follow this sequence:

	What you do:	What you see:
1.	With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*¦crlf`
2.	Press the ⇒ key repeatedly until **image** is displayed	`*SETUP* image`
3.	Press the ⇓ key	`image=EXPAND`
4.	Press the ⇒ key	`image UNIFORM`
5.	Press the ⇓ key	`image=UNIFORM`
6.	Press the ONLINE key	`OCT 10 12:00:00`

SETUP: image: EXPAND/

The **EXPAND/** option causes the horizontal distance between the dots of the graphic image to be periodically readjusted to cancel the effect of resolution differences between this printer and the printer emulated. Also, when data is supplied to the printer with the most significant bit set, italic characters are printed rather than those in the upper half of the character set of the current font.

To select **EXPAND/** from the **SETUP: image** menu, follow this sequence:

	What you do:	What you see:
1.	With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*¦crlf`

2. Press the ⇒ key repeatedly until **image** is displayed — `*SETUP* image`

3. Press the ⇓ key — `image=EXPAND`

   This is the first item in the **image** sub-menu and is currently selected (as indicated by the = sign).

4. Press the ⇒ key repeatedly until **EXPAND/** is displayed — `image EXPAND/`

   Press the ⇓ key — `image=EXPAND/`

   Press the ONLINE key — `OCT 10 12:00:00`

SETUP: image: UNIFORM/

The **UNIFORM/** option causes the printer to print bit-map graphic images exactly as they are received from the host computer with no adjustment to the horizontal spacing of the dots. Also, when data is supplied to the printer with the most significant bit set, italic characters are printed rather than those in the upper half of the character set of the current font.

To select **UNIFORM/** from the **SETUP: image** menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **image** is displayed	`*SETUP* image`
3. Press the ⇓ key	`image=EXPAND`
4. Press the ⇒ key repeatedly until **UNIFORM/** is displayed	`image UNIFORM`

5. Press the ⇓ key	`image=UNIFORM/`
6. Press the ONLINE key	`OCT 10  12:00:00`

SETUP: escape

This item only appears in the SETUP menu when **LAYOUT** is the operating mode currently selected under **SELECT: mode** (see earlier in this chapter).

When **escape** is selected from the SETUP menu, a sub-menu is presented containing the following items:

- $(36)
- @(64)
- `(96)
- →(126) (Note that ASCII character 126 is ~)
- none

These options are alternative escape characters that can be used as part of a LAYOUT command sequence.

To select **escape** from the SETUP menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **escape** is displayed	`*SETUP* escape`
3. Press the ⇓ key This is the first item in the **escape** sub-menu.	`escape=$(36)`
4. Use the ⇐ and ⇒ keys to display the remaining items in this sub-menu.	
5. Press the ONLINE key	`OCT 10  12:00:00`

SETUP: escape: $(36)

This option instructs the printer to accept the dollar sign ($) as an alternative to the usual escape character when operating in LAYOUT mode. The dollar sign has an ASCII value of 36 decimal (as indicated by the number in brackets) and 24 hexadecimal.

To select the dollar sign as the alternative escape character, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **escape** is displayed	`*SETUP* escape`
3. Press the ⇓ key	`escape=$(36)`
This is the first item in the **escape** sub-menu and is currently selected (as indicated by the = sign).	
Note that **$(36)** is the factory setting for the alternative escape character parameter.	
4. If **$(36)** is already selected, press the ONLINE key	`OCT 10  12:00:00`
if not, use the ⇐ and ⇒ keys until **$(36)** is displayed	`escape $(36)`
press the ⇓ key	`escape=$(36)`
and then press the ONLINE key	`OCT 10  12:00:00`

SETUP: escape: @(64)

This option instructs the printer to accept the at sign (@) as an

alternative to the usual escape character when operating in LAYOUT mode. The at sign has an ASCII value of 64 decimal (as indicated by the number in brackets) and 40 hexadecimal.

To select the at sign as the alternative escape character, follow this sequence:

	What you do:	What you see:
1.	With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2.	Press the ⇒ key repeatedly until **escape** is displayed	`*SETUP* escape`
3.	Press the ⇓ key	`escape=$(36)`
4.	Press the ⇒ key	`escape @(64)`
5.	Press the ⇓ key	`escape=@(64)`
6.	Press the ONLINE key	`OCT 10 12:00:00`

SETUP: escape: `(96)

This option instructs the printer to accept a grave (`) as an alternative to the usual escape character when operating in LAYOUT mode. The grave has an ASCII value of 96 decimal (as indicated by the number in brackets) and 60 hexadecimal.

To select the a grave as the alternative escape character, follow this sequence:

	What you do:	What you see:
1.	With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2.	Press the ⇒ key repeatedly until **escape** is displayed	`*SETUP* escape`
3.	Press the ⇓ key	`escape=$(36)`

4. Press the ⇒ key twice	`escape '(96)`
5. Press the ⇓ key	`escape='(96)`
6. Press the ONLINE key	`OCT 10 12:00:00`

SETUP: escape: →(126)

This option instructs the printer to accept the tilde (~) as an alternative to the usual escape character when operating in LAYOUT mode. The tilde has an ASCII code of 126 decimal (as indicated by the number in brackets) and 7E hexadecimal.

To select the tilde as the alternative escape character, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **escape** is displayed	`*SETUP* escape`
3. Press the ⇓ key	`escape=$(36)`
4. Press the ⇒ key three times	`escape →(126)`
5. Press the ⇓ key	`escape=→(126)`
6. Press the ONLINE key	`OCT 10 12:00:00`

SETUP: escape: none

This option disables recognition of any alternative escape character when the printer is operating in LAYOUT mode.

To select **none** as the setting for this parameter, follow this sequence:

Printer Settings

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **escape** is displayed	`*SETUP* escape`
3. Press the ⇓ key	`escape=$(36)`
4. Press the ⇒ key four times	`escape none`
5. Press the ⇓ key	`escape=none`
6. Press the ONLINE key	`OCT 10 12:00:00`

SETUP: serial

If the printer is connected to the host computer via the serial interface, all the communication parameters can be set using this item in the SETUP menu.

When **serial** is selected from the SETUP menu, a sub-menu containing the following items is presented:

- baud
- format
- stop
- flow
- dtr

To select **serial** from the SETUP menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **serial** is displayed	`*SETUP* serial`

3. Press the ⇓ key

`serial |baud`

This is the first item in the **serial** sub-menu.

4. Use the ⇐ and ⇒ keys to display the remaining items in this sub-menu.

5. Press the ONLINE key

`OCT 10 12:00:00`

SETUP: serial: baud

This option is used to set the speed of data transfer from the host computer to the printer (baud rate).

When **baud** is selected from the **SETUP: serial** menu, a sub-menu containing the following items is presented:

- 9600
- 19200
- 300
- 600
- 1200
- 2400
- 4800

These are the various baud rate options.

To select **baud** from the **SETUP: serial** menu and select a new baud rate, 4800 for example, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **serial** is displayed in the SETUP menu	`*SETUP* serial`
3. Press the ⇓ key	`serial |baud`

4. Press the ⇓ key

   `baud=9600`

   This is the first item in the **baud** sub-menu.

   Note that **9600** is the factory setting for the baud rate parameter.

5. To select **4800** as the new baud rate, use the ⇐ or ⇒ key until **4800** is displayed

   `baud 4800`

6. Press the ⇓ key

   `baud=4800`

7. Press the ONLINE key

   `OCT 10  12:00:00`

SETUP: serial: format

When **format** is selected from the **SETUP: serial** menu, a sub-menu containing the following items is presented:

- 8+NONE
- 7+NONE
- 8+EVEN
- 7+EVEN
- 8+ODD
- 7+ODD
- 8+ZERO
- 7+ZERO
- 8+MARK
- 7+MARK

This is the list of data transfer formats allowed by the printer. The options consist of two parts, the number of data bits (7 or 8) and the parity setting (NONE, EVEN, ODD or MARK).

To select **format** from the **SETUP: serial** menu and select a new data transfer format, **7+EVEN** for example, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **serial** is displayed in the SETUP menu	`*SETUP* serial`
3. Press the ⇓ key	`serial |baud`
4. Press the ⇒ key	`serial  format`
5. Press the ⇓ key This is the first item in the **baud** sub-menu.	`format=8+NONE`
6. To select **7+EVEN** as the data transfer format, use the ⇐ or ⇒ key until **7+EVEN** is displayed	`format 7+EVEN`
7. Press the ⇓ key	`format=7+EVEN`
8. Press the ONLINE key	`OCT 10  12:00:00`

SETUP: serial: stop

When **stop** is selected from the **SETUP: serial** menu, a sub-menu containing the following items is presented:

- 1
- 2

These options are the two possible settings for the number of stop bits sent from the host computer with each character.

To select **stop** from the **SETUP: serial** menu and select a new setting, **2** for example, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **serial** is displayed in the SETUP menu	`*SETUP* serial`
3. Press the ⇓ key	`serial |baud`
4. Press the ⇒ key twice	`serial stop`
5. Press the ⇓ key This is the first item in the **stop** sub-menu.	`stop=1`
6. To select **2** as the new setting, press the ⇒ key	`stop 2`
7. Press the ⇓ key	`stop=2`
8. Press the ONLINE key	`OCT 10 12:00:00`

SETUP: serial: flow

When **flow** is selected from the **SETUP: serial** menu, a sub-menu containing the following items is presented:

- XON/XOFF
- ETX/ACK
- XON+ETX
- NO FLOW

These options allow you to set the type of handshaking used to pause and continue data transfer between the printer and host computer.

To select **flow** from the **SETUP: serial** menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **serial** is displayed in the SETUP menu	`*SETUP* serial`
3. Press the ⇓ key	`serial |baud`
4. Press the ⇒ key three times	`serial  flow`
5. Press the ⇓ key This is the first item in the **flow** sub-menu.	`flow=XON/XOFF`
6. Use the ⇐ and ⇒ key to display the remaining items in this sub-menu.	
7. Press the ONLINE key	`OCT 10  12:00:00`

SETUP: serial: flow: XON/XOFF

This option enables the printer to use XON/XOFF flow control.

To select **XON/XOFF** from the **SETUP: serial: flow** sub-menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **serial** is displayed in the SETUP menu	`*SETUP* serial`
3. Press the ⇓ key	`serial |baud`

4. Press the ⇒ key three times	`serial flow`
5. Press the ⇓ key	`flow=XON/XOFF`
In this example, the display already shows **XON/XOFF** as the setting selected (as indicated by the = sign).	
6. If **XON/XOFF** is already selected, press the ONLINE key	`OCT 10 12:00:00`
If not, use the ⇐ and ⇒ keys until **XON/XOFF** is displayed	`flow XON/XOFF`
press the ⇓ key	`flow=XON/XOFF`
and then press the ONLINE key	`OCT 10 12:00:00`

SETUP: serial: flow: ETX/ACK

This option enables the printer to use ETX/ACK flow control.

To select **ETX/ACK** from the **SETUP: serial: flow** sub-menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **serial** is displayed in the SETUP menu	`*SETUP* serial`
3. Press the ⇓ key	`serial |baud`
4. Press the ⇒ key three times	`serial flow`
5. Press the ⇓ key	`flow=XON/XOFF`

6. Press the ⇒ key flow ETX/ACK	
7. press the ⇓ key	flow=ETX/ACK
8. Press the ONLINE key	OCT 10 12:00:00

SETUP: serial: flow: XON+ETX

This option enables the printer to use both XON/XOFF and ETX/ACK flow control.

To select **XON+ETX** from the **SETUP: serial: flow** sub-menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	*SETUP*|crlf
2. Press the ⇒ key repeatedly until **serial** is displayed in the SETUP menu	*SETUP* serial
3. Press the ⇓ key	serial |baud
4. Press the ⇒ key three times	serial flow
5. Press the ⇓ key	flow=XON/XOFF
6. Press the ⇒ key twice flow XON+ETX	
7. press the ⇓ key	flow=XON+ETX
8. Press the ONLINE key	OCT 10 12:00:00

SETUP: serial: flow: NO FLOW

This option disables XON/XOFF and ETX/ACK flow control.

To select **NO FLOW** from the **SETUP: serial: flow** sub-menu, follow this sequence:

Printer Settings

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*¦crlf`
2. Press the ⇒ key repeatedly until **serial** is displayed in the SETUP menu	`*SETUP* serial`
3. Press the ⇓ key	`serial ¦baud`
4. Press the ⇒ key three times	`serial  flow`
5. Press the ⇓ key	`flow=XON/XOFF`
6. Press the ⇒ key three times flow NO FLOW	
7. press the ⇓ key	`flow=NO FLOW`
8. Press the ONLINE key	`OCT 10  12:00:00`

SETUP: serial: dtr

When **dtr** is selected from the **SETUP: serial** menu, a sub-menu containing the following items is presented:

- HI/LO
- LO/HI
- HI/HI
- LO/LO

This option allows you to set the type of DTR (data terminal ready) signal used by the printer, high or low.

To select **dtr** from the **SETUP: serial** menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*¦crlf`

2. Press the ⇒ key repeatedly until **serial** is displayed in the SETUP menu	`*SETUP* serial`
3. Press the ⇓ key	`serial |baud`
4. Press the ⇒ key four times	`serial dtr`
5. Press the ⇓ key This is the first item in the **dtr** sub-menu.	`dtr=HI/LO`
6. Use the ⇐ and ⇒ key to display the remaining items in this sub-menu.	
7. Press the ONLINE key	`OCT 10 12:00:00`

SETUP: serial: dtr: HI/LO

This option selects DTR polarity high for ready and low for not ready.

To select **HI/LO** from the **SETUP: serial: dtr** sub-menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **serial** is displayed in the SETUP menu	`*SETUP* serial`
3. Press the ⇓ key	`serial |baud`
4. Press the ⇒ key four times	`serial dtr`
5. Press the ⇓ key In this example, the display already shows **HI/LO** as	`dtr=HI/LO`

Printer Settings

	What you do	What you see
	the setting selected (as indicated by the = sign).	
6.	If **HI/LO** is already selected, press the ONLINE key	`OCT 10  12:00:00`
	If not, use the ⇐ and ⇒ keys until **HI/LO** is displayed	`dtr HI/LO`
	press the ⇓ key	`dtr=HI/LO`
	Press the ONLINE key	`OCT 10  12:00:00`

SETUP: serial: dtr: LO/HI

This option selects DTR polarity low for ready and high for not ready.

To select **LO/HI** from the **SETUP: serial: dtr** sub-menu, follow this sequence:

	What you do:	What you see:
1.	With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2.	Press the ⇒ key repeatedly until **serial** is displayed in the SETUP menu	`*SETUP* serial`
3.	Press the ⇓ key	`serial |baud`
4.	Press the ⇒ key four times	`serial  dtr`
5.	Press the ⇓ key	`dtr=HI/LO`
6.	Press the ⇒ key	`dtr LO/HI`
7.	Press the ⇓ key	`dtr=LO/HI`
8.	Press the ONLINE key	`OCT 10  12:00:00`

SETUP: serial: dtr: HI/HI

This option selects DTR polarity permanently high.

To select **HI/HI** from the **SETUP: serial: dtr** sub-menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **serial** is displayed in the SETUP menu	`*SETUP* serial`
3. Press the ⇓ key	`serial |baud`
4. Press the ⇒ key four times	`serial  dtr`
5. Press the ⇓ key	`dtr=HI/LO`
6. Press the ⇒ key twice	`dtr HI/HI`
7. Press the ⇓ key	`dtr=HI/HI`
8. Press the ONLINE key	`OCT 10  12:00:00`

SETUP: serial: dtr: LO/LO

This option selects DTR polarity permanently low.

To select **LO/LO** from the **SETUP: serial: dtr** sub-menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **serial** is displayed in the SETUP menu	`*SETUP* serial`

Printer Settings

3. Press the ⇓ key	`serial |baud`
4. Press the ⇒ key four times	`serial dtr`
5. Press the ⇓ key	`dtr=HI/LO`
6. Press the ⇒ key three times	`dtr LO/LO`
7. Press the ⇓ key	`dtr=LO/LO`
8. Press the ONLINE key	`OCT 10 12:00:00`

SETUP: parallel

If the printer is connected to a host computer via the parallel interface, the way the signals on the parallel cable are to be interpreted can be set using this item.

When **parallel** is selected from the SETUP menu, a sub-menu is presented, containing the items:

- timing
- bits

To select **parallel** from the SETUP menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **parallel** is displayed	`*SETUP* parallel`
3. Press the ⇓ key	`parallel|timing`

SETUP: parallel: timing

This option is used to set the timing which the printer uses when communicating with the host computer via the parallel interface.

When **timing** is selected from the **SETUP:parallel** menu, a sub-menu containing the following items is presented:

- EARLY
- LATE
- EARLY+
- LATE+

The factory setting for this option is EARLY. It is unlikely that you will ever have problems in communicating via the parallel interface. If you do have problems, try using the EARLY+ option.

SETUP: parallel: bits

This option allows you to set the number of data bits used by the parallel interface.

SETUP: parallel: bits: 7

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **parallel** is displayed	`*SETUP* parallel`
3. Press the ⇓ key	`parallel|timing`
4. Press the the ⇒ key repeatedly until **bits** is displayed	`bits`
5. Press the ⇓ key	`bits=8`
6. If **7** is not already displayed, press the ⇒ key once	`bits 7`
7. Press the ⇓ key	`bits=7`
8. Press the ONLINE key	`OCT 10  12:00:00`

SETUP: parallel: bits: 8

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **parallel** is displayed	`*SETUP* parallel`
3. Press the ⇓ key	`parallel|timing`
4. Press the ⇒ key repeatedly until **bits** is displayed	`bits`
5. Press the ⇓ key	`bits=7`
6. If **8** is not already displayed, press the ⇒ key once	`bits 8`
7. Press the ⇓ key	`bits=8`
8. Press the ONLINE key	`OCT 10 12:00:00`

SETUP: pageram

This item allows you to specify to the printer how much controller memory is to be allocated for page imaging. An important consequence of allocating a certain amount of memory for this purpose is that the memory remaining for down-loading fonts and macros etc may be reduced.

When **pageram** is selected from the SETUP menu, a sub-menu is presented containing the following items:

- A4
- LEGAL
- A3
- 2A4

To select **pageram** from the SETUP menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **pageram** is displayed	`*SETUP* pageram`
3. Press the ⇓ key	`pageram=A4`
This is the first item in the **pageram** sub-menu.	
4. Use the ⇐ and ⇒ keys to display the remaining items in this sub-menu.	
5. Press the ONLINE key	`OCT 10 12:00:00`

SETUP: pageram: A4

This item sets the input buffer size such that it can handle a single page of size A4. When this item is selected, the printer will not be able to handle paper sizes larger than A4.

To select **A4** from the **SETUP: pageram** sub-menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **pageram** is displayed	`*SETUP* pageram`
3. Press the ⇓ key	`pageram=A4`
This is the first item in the **pageram** sub-menu and is currently selected (as	

indicated by the = sign).

4. If **A4** is already selected, press the ONLINE key	`OCT 10 12:00:00`
if not, use the ⇐ and ⇒ keys until **A4** is displayed	`pageram A4`
press the ⇓ key	`pageram=A4`
and then press the ONLINE key	`OCT 10 12:00:00`

SETUP: pageram: LEGAL

This item sets the input buffer size such that it can handle a single page of size LEGAL. When data for the first page has been received, the page must be printed before subsequent data can be processed.

To select **LEGAL** from the **SETUP: pageram** sub-menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **pageram** is displayed	`*SETUP* pageram`
3. Press the ⇓ key	`pageram=A4`
4. Press the ⇒ key	`pageram LEGAL`
5. Press the ⇓ key	`pageram=LEGAL`
6. Press the ONLINE key	`OCT 10 12:00:00`

SETUP: pageram: A3

This item sets the input buffer size such that it can handle pages of size A3.

To select **A3** from the **SETUP: pageram** sub-menu, follow this

sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **pageram** is displayed	`*SETUP* pageram`
3. Press the ⇓ key	`pageram=A4`
4. Press the ⇒ key until A3 is displayed	`pageram A3`
5. Press the ⇓ key	`pageram=A3`
6. Press the ONLINE key	`OCT 10  12:00:00`

Printer Settings

SETUP: pageram: 2A4

This item sets the input buffer size such that it can handle two pages of size A4. When data for the first page has been received, the printer can still accept data for a second A4 page while the first is printing. When this item is selected, larger paper sizes will be printable using single buffering.

To select **2A4** from the **SETUP: pageram** sub-menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **pageram** is displayed	`*SETUP* pageram`
3. Press the ⇓ key	`pageram=A4`

This is the first item in the **pageram** sub-menu and is

currently selected (as indicated by the = sign).	
4. Press the ⇐ and ⇒ keys until **2A4** is displayed	`pageram 2A4`
press the ⇓ key	`pageram=2A4`
and then press the ONLINE key	`OCT 10  12:00:00`

SETUP: buffer

This item allows you to specify the size of the input buffer used to store incoming data. When selected, the buffer parameter can be set at any value between 1 and 255, each unit representing 1 kilobyte of memory.

The larger the buffer you set, the easier it is for the printer to accept data from the host and the sooner it is able to free the host for other activities. However, the larger the buffer, the smaller the available memory for down-loading font and macros etc.

To select **buffer** from the SETUP menu and change the value set, to 32 for example, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **buffer** is displayed	`*SETUP* buffer`
3. Press the ⇓ key	`buffer=16`
4. To select 32 as the new buffer size, press down the ⇒ key and hold it until 32 is displayed	`buffer 32`
5. Press the ⇓ key	`buffer=32`
6. Press the ONLINE key	`OCT 10  12:00:00`

Before the new buffer size of 32 kilobytes will take any effect, the value must be permanently saved using **SETUP: action: FREEZE** (see following section) and the printer must be reset. To reset the printer, use **SELECT: action: reset: *SYSTEM*** (see earlier in this chapter), or turn the printer off and on again.

SETUP: LJarea

This option is used to set the printable page area accoding to the requirements of the print 'engine', the front panel margin settings or HP LaserJet Series II emulation.

SETUP: LJarea: MODE1

This option sets the printable area of the page to the theoretical printable area for this type of page printer. There is a small border around the edge of the page which the printer cannot use.

	What you do:	What you see:
1.	With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2.	Press the ⇒ key repeatedly until **LJarea** is displayed	`*SETUP* LJarea`
3.	Press the ⇓ key	`LJarea=MENU`
4.	Press the ⇒ key repeatedly until **MODE1** is displayed	`LJarea MODE1`
5.	Press the ⇓ key	`LJarea=MODE1`
6.	Press the ONLINE key	`OCT 10 12:00:00`

SETUP: LJarea: MODE2

This option sets the printable area of the page to the area used on the HP LaserJet Series II printer. Any margins set on the front panel are ignored. The 0,0 position is at the top left of the printable area, not the edge of the paper.

Printer Settings

	What you do:	What you see:
1.	With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2.	Press the ⇒ key repeatedly until **LJarea** is displayed	`*SETUP* LJarea`
3.	Press the ⇓ key	`LJarea=MENU`
4.	Press the ⇒ key repeatedly until **MODE2** is displayed	`LJarea MODE2`
5.	Press the ⇓ key	`LJarea=MODE2`
6.	Press the ONLINE key	`OCT 10 12:00:00`

SETUP: LJarea: MENU

This option sets the 0,0 position at the top left corner of the paper (subject to a paper feed tolerance of ± 1mm in the x or y direction). Margin settings are those set on the front panel. There is a small border around the edge of the page which the printer cannot use, so margins must be set so that no text is printed within this non-printing area.

	What you do:	What you see:
1.	With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2.	Press the ⇒ key repeatedly until **LJarea** is displayed	`*SETUP* LJarea`
3.	Press the ⇓ key	`LJarea=MODE1`
4.	Press the ⇒ key repeatedly until **MENU** is displayed	`LJarea MENU`

5. Press the ⇓ key — `LJarea=MENU`
6. Press the ONLINE key — `OCT 10  12:00:00`

SETUP: action

This option in the SETUP menu provides certain system management and self-diagnostic functions.

When **action** is selected from the SETUP menu, a sub-menu is presented containing the following options:

- SELFTEST
- FREEZE1
- FREEZE2
- FREEZE3
- FREEZE4
- *ENABLE*
- NVerase

To select **action** from the SETUP menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **action** is displayed	`*SETUP* action`
3. Press the ⇓ key This is the first item in the **SETUP: action** sub-menu	`action |SELFTEST`
4. Use the ⇐ and ⇒ keys to display the other items in the sub-menu	
5. Press the ONLINE key	`OCT 10  12:00:00`

Printer Settings

SETUP: action: SELFTEST

Selection of this action causes the printer to carry out a number of internal diagnostic tests.

To select **SELFTEST** from the **SETUP: action** sub-menu, follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*│crlf`
2. Press the ⇒ key repeatedly until **action** is displayed.	`*SETUP* action`
3. Press the ⇓ key	`action │SELFTEST`
4. Press the ⇓ key to cause the printer to carry out its internal diagnostic tests	`SELFTEST`
After the action is complete the printer will return to a ready state	`OCT 10  12:00:00`

SETUP: action: FREEZEn

Selection of this action causes the printer to store the current printer configuration in non-volatile memory as one of four retrievable configurations. Once you have decided on a printer setup that best suits your own needs, saving the setup in this way will ensure that the printer can always be reset to this configuration quickly and easily.

To select **FREEZE1 to 4** from the **SETUP: action** sub-menu, first, set-up the printer according to the current requirements and follow this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **action** is displayed.	`*SETUP* action`
3. Press the ⇓ key	`action |SELFTEST`
4. Press the ⇒ key	`action FREEZE1`
5. Press the ⇓ key to save the current printer setup	`FREEZE`
After the action is complete the printer will return to a ready state	`OCT 10 12:00:00`

SETUP: action: *ENABLE*

This option, when selected, enables you to set the date and time from within LAYOUT mode and erase all fonts and macros held in Non-Volatile ram (the latter by using NVerase, see below).

To enable use of date and time setting in LAYOUT, first select **LAYOUT** under the mode option in the SELECT menu. Next select ***ENABLE*** by following this sequence:

What you do:	What you see:
1. With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2. Press the ⇒ key repeatedly until **action** is displayed.	`*SETUP* action`
3. Press the ⇓ key	`action |SELFTEST`
4. Press the ⇒ key five times	`action *ENABLE*`

5.	Press the ⇓ key	`*ENABLE*`
	After the action is complete the printer will return to a ready state	`OCT 10  12:00:00`

SETUP: action: NVerase

This action causes all downloaded fonts and macros currently stored in non-volatile memory to be discarded. This operation has no effect on the settings made through the front panel. This option only appears in the menu after its use has been enabled using the option **SETUP: action: *ENABLE*** (see above).

To select **NVerase**, from the SETUP: action menu, follow this sequence:

	What you do:	What you see:
1.	With the printer switched on, press down and hold the ⇑ key until the display changes	`*SETUP*|crlf`
2.	Press the ⇒ key repeatedly until **action** is displayed.	`*SETUP* action`
3.	Press the ⇓ key	`action  |SELFTEST`
4.	Press the ⇒ key until **NVerase** is displayed	`action NVerase`
5.	Press the ⇓ key	`NVerase`
	After the action is complete the printer will return to a ready state	`OCT 10  12:00:00`

Setting The Date and Time

LAYOUT uses two commands for setting the date and time. The easiest way to issue these commands to the printer is to prepare a document in your word-processor, using the commands shown below.

Create a document with a margin of 0 characters and no bold, italic or other print styles in force.

Setting The Date

To set the date to, for example, 26 August 1990, insert the command:

ESC Z.DATE 90:08:26 (year: month: day)

Note the space between DATE and 90.

Setting The Time

To set the time to, for example, 10:30am, insert the command:

ESC Z.TIME 10:30:00 (hours: minutes: seconds)

Note the space between TIME and 10.

An alternative method is to use a high-level language such as BASIC. In Microsoft BASIC, the following program would set the date and time to those settings shown above:

```
10 LPRINT CHR$(27)+"Z.DATE 90:08:26"
20 LPRINT CHR$(27)+"Z.TIME 10:30:00"
30 END
```

5. USING COMMERCIAL SOFTWARE

Introduction

Different software communicates with the printer in different ways. Some programs are quite sophisticated and can use all the printer's capabilities. Other programs can use only a few of the printer's capabilities.

Some software packages, such as database and accounting programs, make few, if any, special demands of a printer. These programs can generally be used no matter what type of printer you have.

This section explains the various ways in which software communicates with the printer and provides general information on using:

- Printer drivers
- Setup strings
- Embedded printer commands
- Limited support programs

For tips on using particular software applications, see the end of this chapter.

Using Software Programs

The software programs you can use fall into one or more of the following categories:

Some programs "understand" the inner workings of the printer and can automatically issue the proper commands. Usually this capability is built into a sub-program called a **printer driver**.

Some programs can send a command or group of commands to the printer each time they start to print. The group of commands sent to the printer is called a **setup string**.

Some programs let you insert your own printer commands into a file. These commands are called **embedded commands**.

Programs with printer drivers do not usually need setup strings or embedded commands. On the other hand, programs without printer drivers can often use both setup strings and embedded commands.

Using Printer Drivers

Programs that use printer drivers understand the inner workings of the printer and can automatically issue the proper commands.

There are two ways to recognise programs that use printer drivers:

- Programs that use printer drivers usually prompt you for the type of printer you have. This is done when you first install or use a program. Often an installation or setup program is used, although sometimes a menu of printer choices is provided in the main program.
- Programs that use printer drivers have results-oriented, instead of printer-oriented, options. For example, a program that has a prompt like "Enter the sheet feeder bin number" probably uses a printer driver, while a program that prompts "Enter the printer codes for the first sheet feeder bin" probably does not use a printer driver.

If your software uses printer drivers, you do not have to learn about the commands for your printer because the software automatically creates the appropriate commands.

The emulation selected on the printer must match the type of printer driver selected with your software. The emulations available on this printer are listed below:

Printer	Emulation
HP LaserJet Series II	LJET
Diablo 630	DIABLO
Qume Sprint 11	QUME
Epson FX-80	FX80
IBM Proprinter	PROPRIN
Fujitsu M304X Line Printer	LP

Some programs that use printer drivers are listed below. For programs marked with an asterisk, special drivers are available from your dealer.

- AutoCad*
- Display write 4*
- FrameWork
- GEM
- Lotus 1-2-3 (graphics only)*
- Microsoft Word
- Microsoft Works
- MultiMate Advantage
- PFS: First Publisher
- Q&A
- Q&A Write
- SuperCalc (graphics only)
- Symphony*
- Ventura Publisher
- Windows*
- WordPerfect
- WordPerfect Executive
- WordStar 2000+
- WordStar Professional
- XyWrite

Using Setup Strings

A setup string is a command or group of commands that you define. Your software program sends the commands to the printer each time it prints.

Typically a setup string contains a reset command for restoring the printer's default settings. It may also contain commands to select fonts, page size, line spacing, and other options.

Some programs that use setup strings include:

- Dac-Easy Accounting
- Lotus 1-2-3

- SuperCalc
- VP Planner
- WordStar 3.3
- WordPerfect Executive

Using Embedded Commands

Software programs that do not understand printer commands usually allow you to embed printer commands directly into a file.

Using embedded commands, you can access all the capabilities of your printer from the software. However, the commands must be embedded carefully. It is easy to get the printer and your software program "out of synch".

For example, if you embed a command to advance to a new page half way down a page of text, the printer will advance to a new page while your program remains on the previous page. The results may not be what you expected.

The effects can also be more subtle. If you are printing justified text, and you embed a command to change the width of the characters in the middle of a block of text, the lines after the command will not have the same right margin alignment as the lines before the command.

Embedded commands are useful for some tasks but not for others. For example, embedded commands work well for making one line of a spreadsheet bold, but they are not recommended for creating special effects in word processing programs.

Some programs which allow you to embed commands are:

- Lotus 1-2-3
- SuperCalc
- WordStar 3.3
- VP Planner
- Microsoft Word
- Sidekick

Using Limited Support Programs

A few programs do not allow software control of the printer. They do not have printer drivers, and they will not allow embedded commands to be used. If you have this type of program, you can still use the capabilities of the printer through front panel control. You can use the SELECT and SETUP menus to select fonts, specify page layout and formatting, and other printer options. See chapters three and four for details.

Using A3 Paper

This printer can handle A3 paper, in addition to the usual smaller sizes such as Letter, Legal and A4. Using A3 paper allows you to make printouts which would ordinarily only be possible by pasting together smaller sheets.

For example, even in older versions of Lotus 1-2-3, you can set the line length to up to 240 characters, and the page length to 100 lines. Using the settings on the printer's front panel, you can select a character size and line spacing to make this whole print area fit on one A3 page.

Your word processor may allow you to print to a user-defined page size. Again, this means you can print a much larger area of type on a single sheet when A3 paper is used.

Application Tips

This section provides information and tips on using specific software packages. Ask you dealer for a list of the software packages compatible with the printer.

For each program in this section, this format is used:

Printer support: Tells whether the program uses printer drivers, setup strings, embedded commands, or some combination of the three.

Printer selection: Tells where in the program to select the printer driver or printer type.

Helpful tips: Gives hints on using the program.

Lotus 1-2-3

Printer support: Printer drivers, setup strings, and embedded commands. Obtain the printer driver available for this program from your dealer.

Printer selection: Use the **INSTALL** program. Select both a text and graphics printer.

Helpful tips: You can use the /**Print Printer Options** menu to change the report format.

You can use setup strings with the /**Print Printer Options Setup** command. For example, if you are using HP LaserJet emulation, you can select compressed print by using this setup string:

```
\027\038\107\050\083
```

You can embed commands into the first cell in a row. If there are no other entries in that row, 1-2-3 will execute the command but will not print the row. Precede the command with two vertical rule characters (||). To underline one row in a spreadsheet, enter this in the row above it:

```
||\027\038\100\048\068
```

and in the row below it enter:

```
||\027\038\100\064
```

Microsoft Word

Printer support: Printer drivers. Match the printer driver to the emulation you are using.

	Obtain the printer driver available for this program from your dealer.
Printer selection:	Use the **SETUP** program or the **Print Options** menu.
Helpful tips:	Use the **Format Character** menu to set font characteristics.
	Use the **Format Division** menus to set page format.
	Use the **Format Paragraph** menu to set paragraph style.

MultiMate Advantage

Printer support:	Printer drivers, called **Printer Action Tables** or **PAT** files. Match the **PAT** to the emulation you are using.
Printer selection:	Use the **Print Parameters for Document** screen.
Helpful tips:	MultiMate has additional printer action tables and information on the fonts supported.

PageMaker and Windows

Printer support:	Printer drivers. Supports soft fonts.
Printer selection:	Use the **INSTALL** program or the **Printer command on Windows' Control Panel**.
Helpful tips:	Download fonts you use frequently as "permanent fonts" ie, fonts that remain in the printer's memory until it is turned off. This saves time downloading fonts each time you print. See the "Using PCL Printers" section of the **PageMaker Installation Guide** for information on how to do this.

Symphony

Printer support: Printer drivers, setup strings, and embedded commands (worksheet only). Obtain the printer driver available for this program from your dealer.

Printer selection: Use the **INSTALL** program. Select both a text and graphics printer.

Helpful tips: In a worksheet, you can embed commands into the first cell in a row. If there are no other entries in that row, Symphony will execute the command but will not print the row. Precede the command with two vertical rule characters (| |). For example, if you are using HP LaserJet emulation, you can underline one row in a spreadsheet by entering this in the row above it:

```
||\027\038\100\048\068
```

and in the row below it enter:

```
||\027\038\100\064
```


Ventura Publisher

Printer support: Printer drivers. Soft fonts are provided with Ventura Publisher.

Printer selection: Use the **VPPREP** program or the **Printer Info** menu.

Helpful tips: Download fonts you use frequently as "permanent fonts" ie, fonts that remain in the printer's memory until it is turned off. This saves time downloading fonts each time you print. See the "Printer Information" section of the **Xerox Ventura**

Publisher Edition Reference Guide for information on how to do this.

WordPerfect

Printer support: Printer drivers. Match the printer driver to the emulation you are using.

Printer selection: Use the **Printer Control Menu** (press Ctrl-F8).

Helpful tips: Print the **FONT.TST** and **PRINTER.TST** documents to see which fonts the printer driver that you have selected supports.

6. MAINTENANCE

Introduction

This printer does not require any special maintenance. However, to keep it in top condition, it should be cleaned from time to time. Be careful not to drop anything inside the printer.

Other routine maintenance includes replacing the toner cartridge and oil felt, cleaning the corona wires, etc, as prompted by the control panel.

In this section, following the procedures for general maintenance, are instructions for repacking the printer.

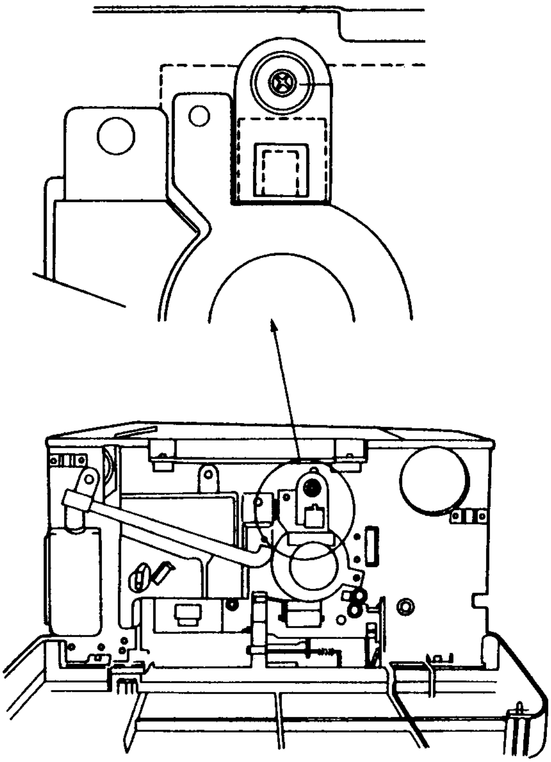
When carrying out maintenance on the printer, please remember the following points:

- Only the following maintenance should be carried out; lubrication is not needed.
- Be sure that the power is off and the power cord unplugged before performing any maintenance.
- Do not use alcohol to clean any part of the printer.
- Be careful not to touch any parts, such as the rollers, that may be hot.
- Do not touch the photoconductive print drum.

Cleaning the Charge Corona Wire

The charge corona wire should be cleaned each time the toner cartridge is replaced. Use the blower brush which comes with the printer.

Open the front cover of the printer and pull out the charge corona unit, marked C:



Removing the charge corona unit

Carefully brush off toner particles by moving the blower brush along the entire length of the wire. Carefully replace the charge corona unit, making sure it slides all the way in before closing the printer's front cover.

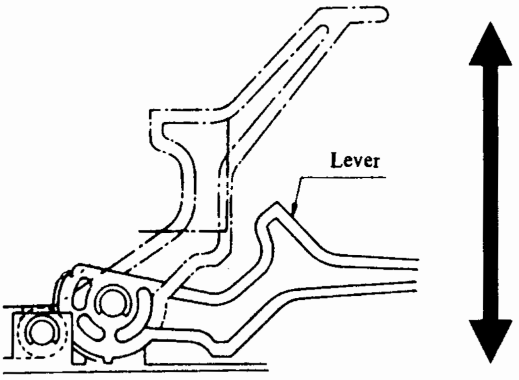
Cleaning the Transfer Unit Wire

The transfer unit wire should be cleaned each time the toner cartridge is replaced. Use the blower brush which comes with the printer.

Open the front cover of the printer and pull out the transfer unit, marked T. Carefully brush off toner particles by moving the blower brush along the entire length of the wire. Carefully replace the transfer unit, making sure it slides all the way in before closing the printer's front cover.

Cleaning the Paper Feed Path

If the paper path becomes dirty, or after a paper jam, the paper path may need cleaning. Open the printer's front cover and lower the carrier station lock lever.



The carrier station lock lever

Wipe off any paper dust and toner particles from the paper path. You may also use a small vacuum cleaner and a soft cloth moistened with a mild detergent.

When you have cleaned the paper path, wait until the inside of the printer is fully dry before raising the carrier station lock lever. Close the printer's front cover.

Replacing the Toner Cartridge

The printer's toner cartridge is designed to last for about 6000 sheets of paper at the recommended duty cycle of 4% black printing. When the supply of toner in the cartridge becomes low, the control panel displays a message prompting you to replace the cartridge.

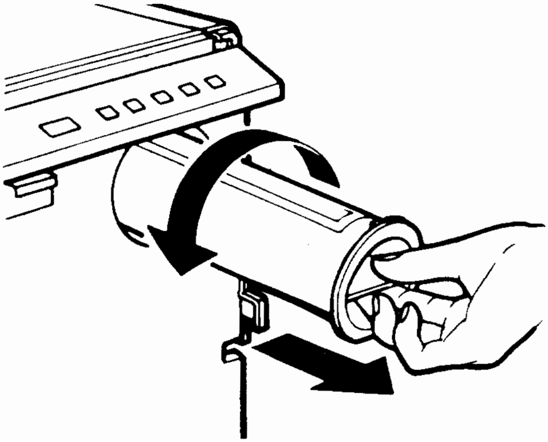
WARNING!
You should not replace the toner cartridge unless the message is displayed. To do otherwise may damage the printer.

When the front panel displays the message:

```
*Toner Empty
```

The following steps must be taken:

1. Switch off the printer and open the front cover.
2. Hold the end of the toner cartridge and turn anticlockwise through 180 degrees.
3. Pull the toner cartridge gently until it is clear of the printer body. There may be a small amount of toner left in the bottom of the cartridge. Place the old cartridge somewhere safe. Dispose of the cartridge safely.
4. Insert a new toner cartridge as described in Section 2. Be sure to shake the process cartridge gently to distribute the toner evenly.



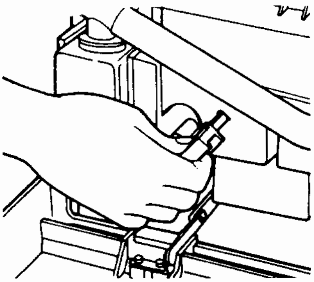
Removing the toner cartridge

WARNING!
If you spill toner, take care not to get any of the powder on your hards, clothes or other soft materials. Use a small vacuum cleaner to clear up any toner spills.

WARNING
When you replace the toner cartridge you must also change the toner collector bottle as described in Section 2. If this is not done, a build up of used toner may cause damage to your printer.

Replacing the Oil Felt

The oil felt, which cleans the heat roller, is designed to last for the same number of pages as the toner cartridge. A new oil felt comes with the new toner cartridge so that they can both be replaced at the same time.

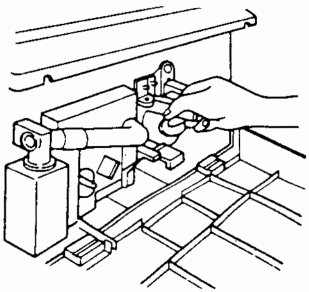


Removing the oil felt

Slide the old oil felt out of the printer body and dispose of safely. Fit the new oil felt as described in Section 2.

Replacing the Cleaner Pad

The cleaner pad, which cleans the photoconductor drum, is designed to last for the same number of pages as a toner cartridge. A new cleaner pad comes with each new toner cartridge so that they can be replaced at the same time.



Removing the cleaner pad

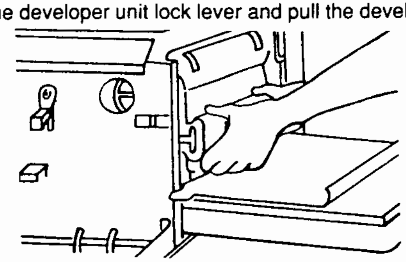
Slide the old cleaner pad out of the cleaner unit and dispose of it safely. Fit the new cleaner pad as describe in Section 2.

Close the printer's front cover.

Replacing the Photoconductive Drum

The photoconductive drum is designed to last for approximately 65,000 sheets of paper. To replace the photoconductive drum, follow these steps:

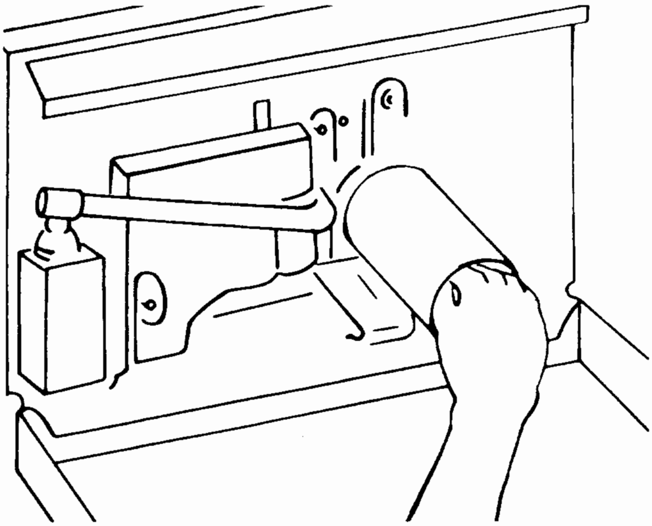
1. Open the printer's front and right hand covers.
2. Lift the developer unit lock lever and pull the developer unit a



Pulling out the developer unit

little way (approx 5 cm) out of the printer.

3. Lower the carrier station lock lever.
4. Pull out the charge corona unit and place it on a level surface.
5. Rotate the print drum locking handle 90 degrees anticlockwise.
6. Pull out the print drum locking handle and place it on a level surface.
7. Place your fingers inside the print drum and carefully pull the drum out. Dispose of the old print drum safely.



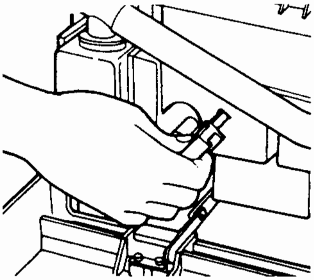
Removing the print drum

8. Now fit the new print drum by following steps 5 to 12 in Section 2 under the heading Installing Printer Components: Print Drum.

Replacing the Developer Unit

The developer unit is designed to last for approximately 65000 sheets of paper. To replace the developer unit, follow these steps:

1. Open the printer's front and right hand covers.

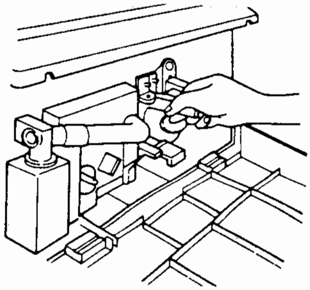


Removing the oil felt

Slide the old oil felt out of the printer body and dispose of safely. Fit the new oil felt as described in Section 2.

Replacing the Cleaner Pad

The cleaner pad, which cleans the photoconductor drum, is designed to last for the same number of pages as a toner cartridge. A new cleaner pad comes with each new toner cartridge so that they can be replaced at the same time.



Removing the cleaner pad

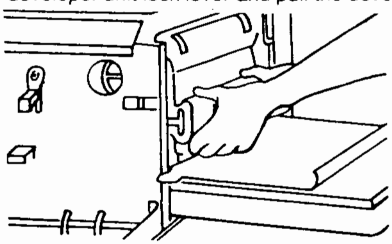
Slide the old cleaner pad out of the cleaner unit and dispose of it safely. Fit the new cleaner pad as describe in Section 2.

Close the printer's front cover.

Replacing the Photoconductive Drum

The photoconductive drum is designed to last for approximately 65,000 sheets of paper. To replace the photoconductive drum, follow these steps:

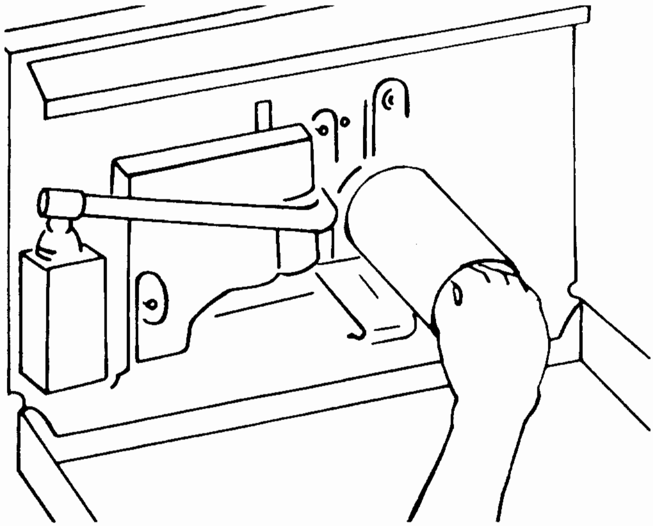
1. Open the printer's front and right hand covers.
2. Lift the developer unit lock lever and pull the developer unit a



Pulling out the developer unit

little way (approx 5 cm) out of the printer.

3. Lower the carrier station lock lever.
4. Pull out the charge corona unit and place it on a level surface.
5. Rotate the print drum locking handle 90 degrees anticlockwise.
6. Pull out the print drum locking handle and place it on a level surface.
7. Place your fingers inside the print drum and carefully pull the drum out. Dispose of the old print drum safely.



Removing the print drum

8. Now fit the new print drum by following steps 5 to 12 in Section 2 under the heading Installing Printer Components: Print Drum.

Replacing the Developer Unit

The developer unit is designed to last for approximately 65000 sheets of paper. To replace the developer unit, follow these steps:

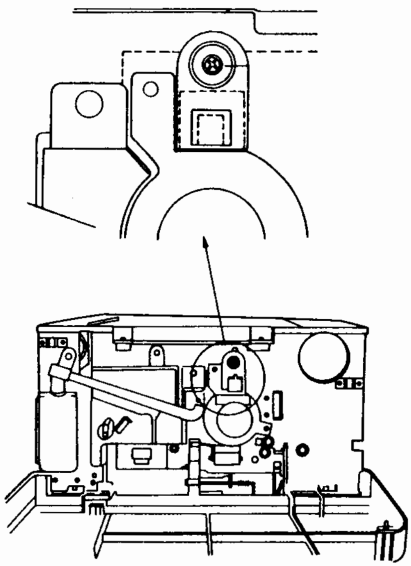
1. Open the printer's front and right hand covers.

2. Lift the developer unit lock lever and pull the developer unit out of the printer body as shown earlier in this section. Dispose of the old developer unit safely.
3. Fit the new developer unit as described in section 2.

Replacing the Charge Corona Unit

The charge corona unit is designed to last for approximately 65000 sheets of paper. To replace the charge corona unit, follow these steps:

1. Open the printer's front cover.
2. Pull out the charge corona unit, marked C, and dispose of safely.



Replacing the charge corona unit

3. Slide the new charge corona unit carefully into the printer. Ensure that it slides all the way in.
4. Close the front cover.

Replacing the Transfer Unit

The transfer unit is designed to last for approximately 65000 sheets of paper. To replace the transfer unit, follow these steps:

1. Open the printer's front cover.
2. Pull out the transfer unit and dispose of safely.
3. Slide the new transfer unit carefully into the printer. Ensure that it slides all the way in.
4. Close the front cover.

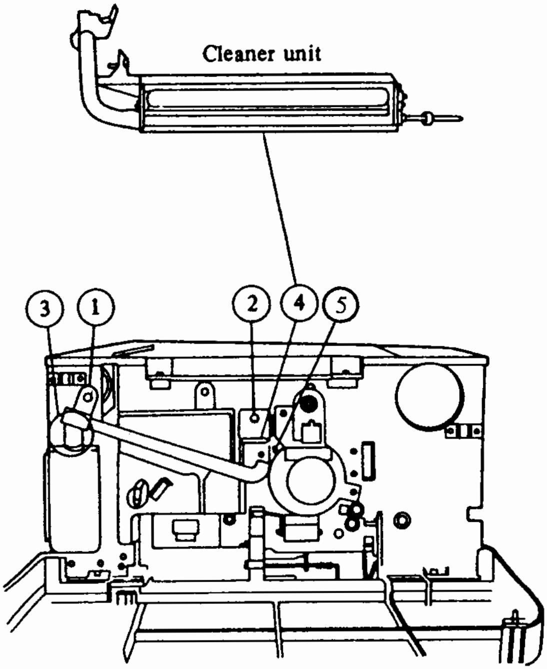
Replacing the Cleaner Unit

The cleaner unit is designed to last for approximately 65000 sheets of paper. To replace the cleaner unit, follow these steps:

1. Open the printer's front cover.
2. Slide out the cleaner pad from the cleaner unit (5). Lay the cleaner pad down on a clean surface.
3. Unscrew (anticlockwise) the black ribbed thumbscrew above the toner collector bottle (1).
4. Unscrew (anticlockwise) the black ribbed thumbscrew above the other end of the used toner pipe (2).
5. Remove the toner pipe from the toner collector bottle (3). **Note: The used toner pipe contains toner. Put a length of tape over the open end of the pipe to prevent spilling toner.**

WARNING!
If you spill toner, take care not to get any of the toner on your hands, clothes or other soft materials. Use a small vacuum cleaner to clear up any toner spills.

6. Pull the cleaner unit (4) out of the printer body.
7. Dispose of the old cleaner unit safely.



Removing the cleaner unit

8. Fit the new cleaner unit, sliding it all the way into the printer body. Connect the free end of the used toner pipe to the toner collector bottle.
9. Tighten (clockwise) the thumbscrews above the toner collector bottle and at the other end of the used toner pipe.
10. Slide the new cleaner pad into the new cleaner unit.
11. Close the front cover.

Repacking the Printer

When you need to remove the printer or prepare it for storage,

note the following:

- Repack it using the carton and packing material originally supplied.
- Enclose the printer in its protective plastic bag to protect against moisture.
- Use the polystyene pads as cushions.

7. PROBLEM SOLVING

Introduction

Although the printer is extremely reliable, occasional problems may occur. You can solve many of these problems yourself using the procedures in this chapter. Other problems will require assistance from your dealer or a service technician.

This chapter is organised as follows:

- Solving problems
- Paper jams
- Poor print quality
- Other problems
- Error messages

Solving Problems, The First Steps

When something goes wrong with the printer, you should:

- Try to solve the problem yourself using the procedures in this chapter.
- Contact your dealer or distributor for assistance.

In some cases you will not be able to solve the problem yourself and should contact your dealer or distributor immediately. Be prepared to provide the following information:

- Model number and serial number of the printer
- Date of manufacture
- Interface type
- Description of problems

The serial number, model number, and date of manufacture are located on the nameplate on the back of the printer.

Paper Jams

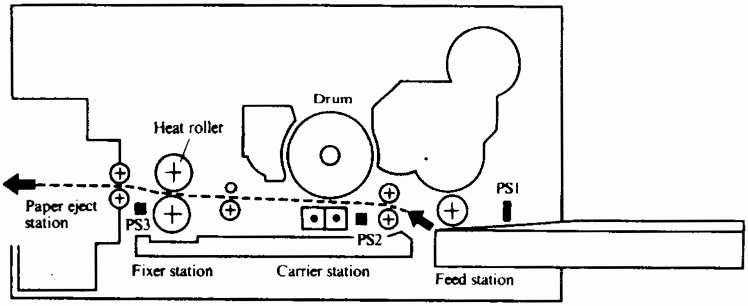
Problem	Solution
Paper is not fed from the paper cassette.	Remove the top sheet of paper and ensure that the manual feed slide is back.

	Remove and reload the paper into the cassette.
	Replace lid of cassette and refit cassette.
Paper is not ejected to the stacker.	Ensure the face down stacker and/or output tray are fitted correctly.
Other jams.	Remove any wavy or damaged paper.

Removing Jammed Paper

Paper jams do not occur very often. However, remove the paper as soon as possible if there is a jam to avoid problems due to overheated paper. The printer has a simple paper path, so jammed paper is quite easy to remove.

1. Check the message on the front panel and refer to the diagram below:



Note: ■ are photoelectric switches for detecting paper jams (PS1 ~ PS3).
⊕ are paper feed rollers.

Paper path

2. Open the front cover and find where the jam has occurred.
3. If the jam occurs in the carrier station, lower the carrier station lock lever to remove the trapped paper.
4. Clean any toner out of the paper path.

Storing Paper

Observe the following when storing paper to avoid paper jams and problems with print quality:

1. Do not expose paper to moisture or direct sunlight. Damp paper is likely to lose its electrostatic charge and dry paper is likely to have an unwanted electrostatic charge. Both of these conditions cause poor print quality.
2. Store remaining paper in its original package or re-wrap it.
3. Store paper flat. Curled paper is likely to jam.

Print Quality

Problem	Solution
Printing is too light.	Turn the print density dial to the right (the coarse and fine density adjusters are behind the small flap on the right hand side of the printer).
	Use dry paper.
	Clean the transfer charger corona wire.
Printing is too dark.	Turn the print density dial to the left.
Density is uneven.	Clean the corona wire.
	Clean the pre-charger.
Vertical white lines appear.	Clean the transfer unit wire and charge corona wire. Check that the developer unit is fitted correctly (see Section 2).
Stains or smudging occurs.	Clean the paper path.
	Replace the oil felt, if necessary.
	Print several pages if the problem occurred after jammed paper was removed.

Printer Status

Problem	Solution
Power does not turn on.	Check the power cord and connection.
The printer does not initialise correctly.	Close the front and right side cover correctly. Check that the carrier station lock lever is raised. Install the face down stacker.

Check and Error Messages

When a check condition occurs, ie when the printer detects a situation requiring user attention, you must take action to remove the cause of the check condition. After removing the cause of the check condition, printing will continue as normal.

If a check condition occurs during printing, one of the following messages will be displayed:

`*C1 Out of Paper`	The standard paper cassette is out of paper. Fill the cassette as described in section 2.
`*C2 Out of Paper`	The second cassette or large capacity hopper is out of paper. Fill the hopper as described in section 2.
`*Out of Paper`	All paper cassettes are out of paper. This message occurs when the printer is set to switch automatically between feeds when one is out of paper.
`*C1 Load PAPER`	The wrong sized paper has been loaded. (This message will be

displayed alternately with the '*C1 Unload PAPER' message, see below). Remove paper as specified by 'PAPER' in the 'unload' message and reload with paper specified by 'PAPER' in the 'load' message. For example, the check message might read:

```
*C1 Load A4
```

meaning that you should fill cassette 1 with A4 paper.

```
*C2 Load PAPER
```

The wrong sized paper has been loaded. (This message will be displayed alternately with the '*C2 Unload PAPER' message, see below). Remove paper as specified by 'PAPER' in the 'unload' message and reload with paper specified by 'PAPER' in the 'load' message. For example, the check message might read:

```
*C2 Load A4
```

meaning that you should fit an A4 paper cassette or load the large capacity hopper with A4 paper.

```
*MANUAL PAPER
```

Feed paper of the size indicated by 'PAPER' into the manual feed slot. For example the message might read:

```
*MANUAL A4
```

meaning that a sheet of A4 paper should be fed into the slot. Ensure that the manual feed slide on the top of the standard paper cassette is

pulled all the way back.

*C1 Unload PAPER	The wrong sized paper has been loaded. (This message will be displayed alternately with the '*C1 Load PAPER' message, see above).
*C2 Unload PAPER	The wrong sized paper has been loaded. (This message will be displayed alternately with the '*C2 Load PAPER' message, see above).
*Please Wait	Printer is temporarily non-operational.
?Cover Open	The front cover of the printer is open.
*Paper Jam 2	Paper did not reach paper sensor 2. Check the paper path to the right of sensor 2.
*Paper Jam 3	Paper did not reach paper sensor 3. Check the paper path to the right of sensor 3.
*Paper Jam 4	Paper did not clear paper sensor 2. Check the immediate area of sensor 2.
*Paper Jam 5	Paper did not clear paper sensor 3. Check the immediate area of sensor 3.
*Paper Jam 6	Paper did not clear the second paper cassette or the large capacity hopper. Check the exit of the hopper for jammed paper.

*Collector out	The toner collector bottle has been removed. Refit the bottle before continuing.
*Toner Empty	The toner cartridge should be replaced.
*Hopper Unready	The input hopper is not ready for operation. Check the power supply to the large capacity hopper.
*Hopper Open	The door of the large capacity hopper is open. Close the door before continuing.
*Stacker Unready	The face down stacker is not ready for operation. Remove the stacker and refit carefully before continuing.
*Stacker Full	The face down stacker is full. Empty the stacker before continuing.

In addition to the above messages, all of which can be dealt with by the user, there are a number of messages which relate directly to the various parts of the printer's software and hardware. Should any of these messages be displayed, contact your authorised dealer or representative for further advice.

*Fuser	Fuser abnormality.
*Status Error	Print module status unobtainable.
*Laser power	Laser power abnormality.
*BD Cycle	Beam detect cycle abnormality.

`*Mirror Motor`	Mirror motor rotation abnormality
`*Scan Motor`	Scan motor abnormality.
`*Main Motor`	Main motor abnormality.
`*Resetting/C`	Module failed to accept command.
`*Resetting/S`	Module failed to return status.
`*Resetting/P`	Module failed to act on print request.
`ROM1 Data Faulty`	Resident font data in ROM1 is incorrect.
`ROM2 Data Faulty`	Resident font data in ROM2 is incorrect.
`ROM3 Data Faulty`	Resident font data in ROM3 is incorrect.
`NRAM Data Faulty`	Font data in non-volatile memory is incorrect.

Additional Check Messages

If any of the following messages is displayed, remove and re-insert the font card as described in appendix A. If the check condition persists, try another IC font card and, if all else fails, contact your authorised dealer or representative for further advice.

`MCa Data Faulty`	Font data in card A is incorrect.

`MCb Data Faulty`	Font data in card B is incorrect.
`MCc Data Faulty`	Font data in card C is incorrect.

A. SUPPLIES & OPTIONS

Supplies

The supplies listed below are available by contacting your dealer.

Toner Cartridge Pack

Part no: B02L-7470-0012A

The toner cartridge package contains a toner cartridge, a heat roller felt and a toner collector bottle. The heat roller felt and toner collector bottle should be replaced at the same time as the toner cartridge. The package also contains a plastic bag for the disposal of the used consumables.

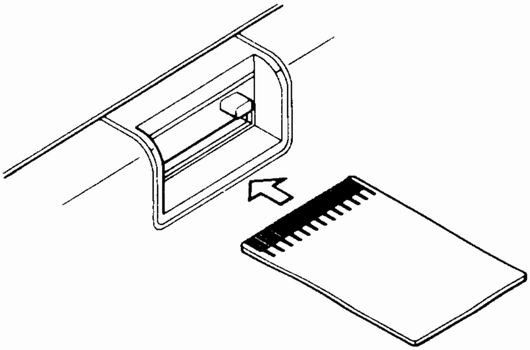
Options

Installing an IC Card

Up to three IC cards can be used at one time with this printer. These cards can be used to add non-resident fonts, emulations and style macros.

The three IC card slots are located on the right side of the printer body, under lift-off covers.

To insert a card, lift off the cover of one of the slots and insert the card with the label uppermost. Push the card until it clicks into place.



Inserting an IC card

To remove a card, press the button at the side of the slot and the card will pop out slightly. Remove the card and return it to its plastic case. Replace the slot cover.

NOTE: If an IC card carries an emulation, the card must be mounted in slot 1 (nearest the front of the printer). Font cards may be mounted in any of the three slots.

B. PAPER SPECIFICATIONS

Paper specifications

A variety of types and sizes of paper can be used, providing that they meet the requirements listed below.

Consult your authorised dealer before testing unspecified or unusual printing materials.

Type

Plain photocopier paper or similar is recommended for use in the printer. Clear film, as designed for overhead transparencies, can also be used.

Size

Main cassette feed:

A4: 210mm x 297mm (8.3in x 11.7in)
A3: 297mm x 420mm (11.7in x 16.5in)
Letter: 216mm x 279mm (8.5in x 11in)
Legal: 216mm x 356mm (8.5in x 14in)

Second cassette feed:

A4: 210mm x 297mm (8.3in x 11.7in)
A3: 297mm x 420mm (11.7in x 16.5in)
Letter: 216mm x 279mm (8.5in x 11in)
Legal: 216mm x 356mm (8.5in x 14in)

Manual feed:

Any size between:
A3: 297mm x 420mm (11.7in x 16.5in)
A6: 105mm x 148mm (4.1in x 5.8in)

Large capacity hopper:

A4: 210mm x 297mm (8.3in x 11.7in)
Letter: 216mm x 279mm (8.5in x 11in)

	Legal:	216mm x 356mm (8.5in x 14in)

Weight

Paper cassette and second cassette:
$64\ g/m^2$ to $90\ g/m^2$

Manual feed:
$64\ g/m^2$ to $128\ g/m^2$

Large capacity hopper:
$64\ g/m^2$ to $90\ g/m^2$

C. TECHNICAL SPECIFICATIONS

Introduction

This appendix outlines the printer's physical, electrical, and environmental specifications, performance, and paper handling ability.

Printer Specifications and Performance

Dimensions and Weight

Dimensions do not include those of the paper cassette and stacker.

Width: 485 mm (19.1 in)
Depth: 560 mm (22 in)
Height: 310 mm (12.2 in)

Weight: 50 kg (110 lb) in the standard configuration.

AC Input Power

100 to 120 VAC ± 10%, 50/60 ± 2 Hz (USA)
220 to 240 VAC ± 10%, 50 ± 1 Hz (Europe)

Power Consumption

Less than 1KVA

Temperatures

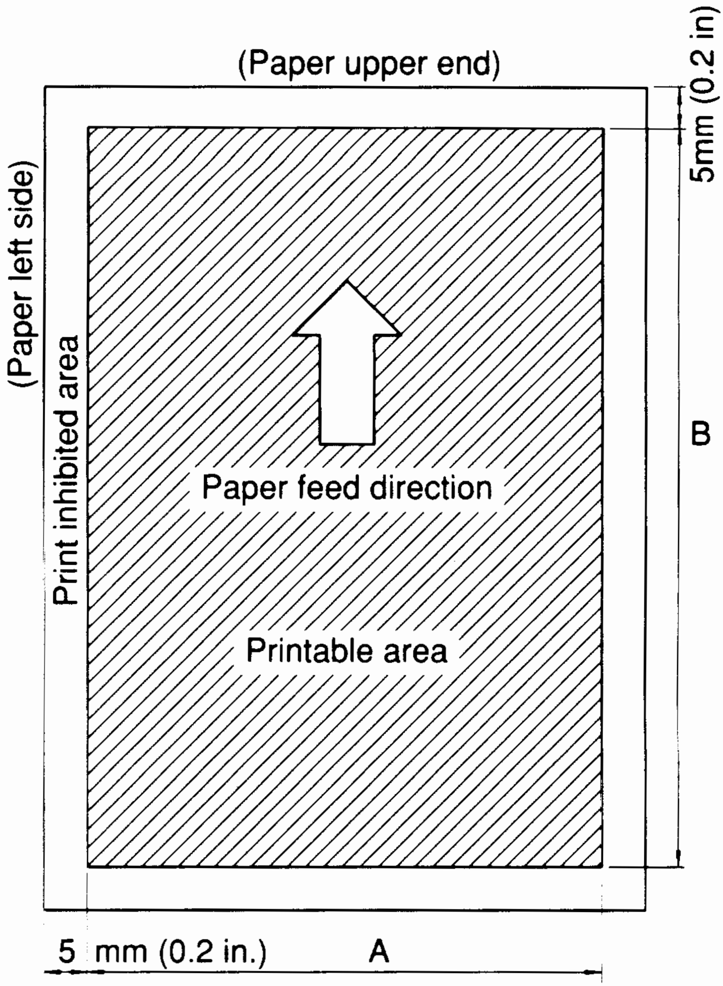
Operating: 10°C to 35°C (50°F to 95°F)
Stored: 0°C to 35°C (32°F to 95°F)

Humidity

Operating: 20% to 80% RH (no condensation)
Maximum wet bulb temperature 29°C (84.2°F)
Stored: 20% to 80% (no condensation)

Printable Area

The following diagram shows the printable area and paper feed direction when printing in portrait orientation:



Paper feed direction

Printing Technology

Laser diode and electrophotography

Developing Method

Two component magnet brush

Fixing

Heat roller fixing

Mechanical Control

Video interface

Print Resolution

300 x 300 dots per inch (both text and graphics)

Printing Speed

Paper Size:	Speed (maximum):
A3	12 sheets per minute
A4	22 sheets per minute
Letter	22 sheets per minute
Legal	14 sheets per minute
Ledger	12 sheets per minute

Warm-up Time

120 seconds max at 25°C

Recommended Duty Cycle

Up to 25,000 pages per month

Backup Roller Life

200,000 sheets (Consult your authorised printer dealer or engineer)

Charge Corona Wire Life *

65,000 sheets or 6 months (Consult your authorised printer dealer or engineer)

Cleaner Unit Life *

65,000 sheets or 6 months (Consult your authorised printer dealer or engineer)

Developer Unit Life *

65,000 sheets or 6 months (Consult your authorised printer dealer or engineer)

Fuser Unit Life

200,000 sheets (Consult your authorised printer dealer or engineer)

Ozone Filter Life

130,000 sheets (Consult your authorised printer dealer or engineer)

Photoconductive Drum Life *

65,000 sheets or 6 months (Consult your authorised printer dealer or engineer)

Toner Cartridge Life *

6,000 sheets at 5% black printing

Transfer Unit Life *

65,000 sheets or 6 months (Consult your authorised printer dealer or engineer)

* : Printing conditions, papers, and environment conditions may affect these values.

Safety Certification

Safety:	UL 478, CSA 22.2-220, IEC 380, VDE 0806
Radiation:	FCC Class A, VDE 0871 Class B

Fonts

Resident:	COURIER12	(Courier 12pt. 10pitch)
	PRESTIGE10	(Prestige Elite 10pt. 12pitch)
	PRINTER8	(Line Printer 8.5pt. 16.66pitch)
	TMSRMN8	(Dutch 801, 8pt. PS: Hewlett-Packard Co. F font cartridge compatible)
	TMSRMN10	(Dutch 801, 10pt. PS: Times Roman 10pt. equivalent)
	TMSRMN12	(Dutch 801, 12pt. PS: Times Roman 12pt. equivalent)
	HELV14B	(Swiss 721, 14pt. PS: Helvetica 14pt. Bold equivalent)
IC Card:	Bit map fonts	
Downloadable:	Bit map fonts	

Computer Interface

Centronics and RS-232C

Emulations

Resident:

HP LaserJet Series II
Diablo 630
Qume Sprint 11
Epson FX-80
IBM Proprinter
Fujitsu M304X Line Printer

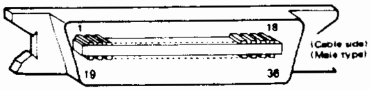
Acoustical Noice

52 dBA or less.

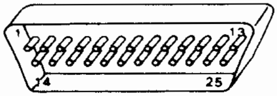
D. INTERFACE INFORMATION

Interfacing

This printer can communicate with a computer through both parallel (Centronics) and serial (RS-232C) interfaces.



Centronics interface connector



RS-232C interface connector

Parallel Interface

Hardware Requirements

Signal levels: TTL-compatible

0.0 to +0.4 V for low level
+2.4 to +5.5 V for high level

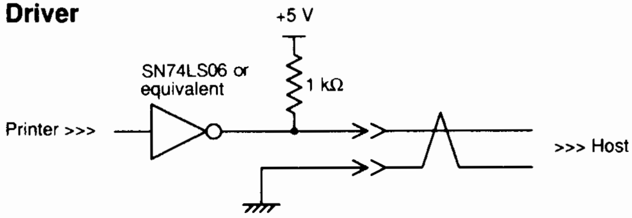
Output circuit: SN74LSO6 or equivalent

Input circuit: SN74LS14 or equivalent

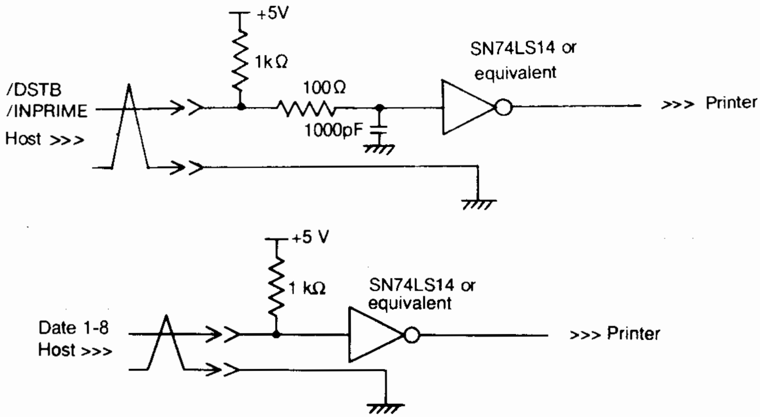
NOTE:
The signal levels given above are at the interface connector. Incorrect signals may be given at power-on and power-off.

The interface signal driver and receiver must be the same as those shown overleaf. The parallel interface connector is an Amphenol-DDK (57FE-30360) or its equivalent.

Driver



Receiver



Centronics compatible interface signal driver-receiver

Connector Pin Assignment

The parallel connector pin assignments are shown in the table overleaf.

Signal definition:

Parallel Interface Signals

Connector pin number	Return line pin number	Signal name	Direction	Description
1	19	Data Strobe (/DSTB)	In	Low level pulse used from the host, used as a synch clock for reading data. /ACK has been returned before issuing the next /DSTB. /DSTB is ignored if BUSY is high.
2-9	20-27	Data 1-8	In	Data 8 is the most significant bit, but is not used in 7-bit ASCII mode. All signals must go high at least 0.5µs before the falling edge of the Data Strobe signal and must stay high for at least 0.5µs after the rising edge.
10	28	Acknowledge (/ACK)	Out	Low level pulse from the printer, used to indicate that the printer can receive data.
11	29	Busy	Out	High indicates that printer is not ready to receive data. Issued if input buffer

				is full or error condition or the ON-LINE key is pressed when printer is on-line.
12	-	PE	Out	This signal goes high when paper runs out.
13	-	SLCT	Out	High level indicate on-line state. Goes low in following cases: error conditions; ON-LINE key pressed when on-line; off-line state, including test and setup modes.
14	-	-		(Reserved)
15	-	-		(Reserved)
16	-	Signal Ground (SG)		Signal ground level (0V)
17	-	Frame Ground (FG)		Frame ground line
18				(Reserved)
31	30	/IN-PRIME	In	Low level initialises the printer. When this signal goes on, the printer clears the data in buffers.
32	-	/ERROR	Out	Low level indicates the printer is in an error state.
33	-	SG		Signal ground level (0V)

34	-	-	-	(Reserved)
35	-	+5V	Out	Connected to +5V through 3.3 k ohm register
36	-	-		(Reserved)

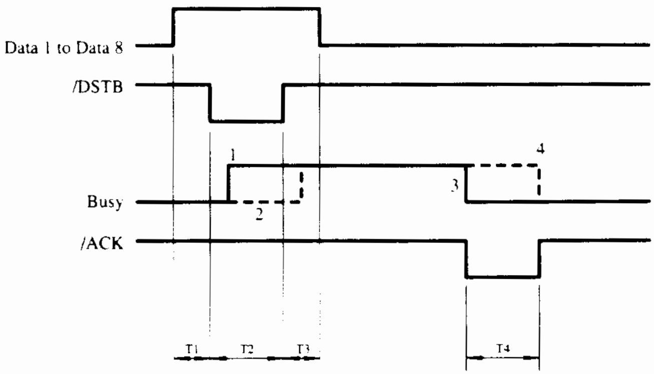
Notes:

1. The return pins are connected to ground level (0V).
2. Direction. It indicates a signal input to the printer; Out indicates a signal output from the printer.
3. Return Line. Represents a twisted pair return line, one side of which is connected to ground level.

Data Transmission Timing

The printer receives data from the computer in handshake mode based on the Busy and Acknowledge signals from the printer and the Data Strobe signal from the computer.

Timing for the Busy, Data Strobe, and Acknowledge signals must be as shown in the figure below.



T1, T2, T3 ≥ 0.5 microseconds
T4 = 10 microseconds

BUSY/ACK signal timing

The BUSY signal timings (1 and 2) against the /DSTB signal and its fall timings (3 and 4) against the /ACK signal can be selected from the SETUP menu on the front panel.

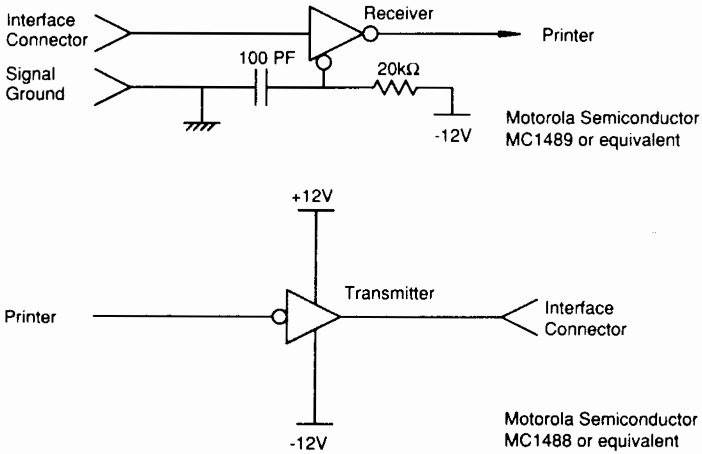
Serial Interface

Hardware Requirements

Signal levels:

- -12 V or lower for a mark condition (logical 1)
- +12 V or higher for a space condition (logical 0)

The interface signal driver and receiver must be the same as shown below:



RS-232C interface signal transmitter and receiver

The printer end of the interface cable must be a 25 pin D-subminiature Canon or Cinch DB-25P male connector with a metal hood, or its equivalent.

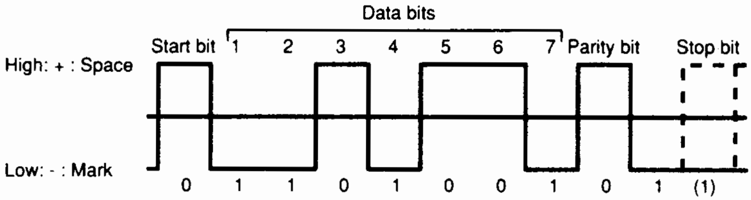
Connector Pin Assignment

Pin number	Designation	Direction	Function
1	FG		Frame/Chassis Ground Safety/Protective Ground
2	TD	Out	Transmitted Data: The printer can only transmit data to the host when RTS, CTS, DSR and DTR are ON.
3	RD	In	Received Data: Signals on this circuit represent commands and/or print data sent to the printer for execution. This circuit is held in marking (low) while CD is off.
4	RTS	Out	Request to Send: When this signal is ON (low), the printer is resetting the host to send data or is transmitting data to the host. After this signal is turned on and the CTS goes on, the printer begins transmitting data.
5	CTS	In	Clear to Send: This signal is turned on when the host confirms that the RTS is 0 and data from the printer can be received.
6	DSR	In	Data Set Ready: When this signal is on, the host is ready to transmit data. When this signal is off, the printer ignores data on the RD line.
7	SG	-	Signal Ground. This line is a signal ground and provides a common reference potential for all lines.
8	CD	In	Received Line Signal Detect:

			During transmission of data to the printer, the host keeps this line on (low). If this signal is off, the printer ignores data on the RD line.
9-19	-	-	Reserved.
20	DTR	Out	Data Terminal Ready: When this signal is on, the host can transmit data to the printer. After the power is turned off and the printer logic is cleared, DTR is set on and remains on while the printer is ready for data communication. When this signal is off, the host is disconnected from the communication channel after data transmission.
21-25	-	-	Reserved.

Serial Data Format

Serial data consists of a start bit, data bits, a parity bit, and one or two stop bits. A bit is in the mark state when not in transmission. Data bits start with the least significant bit (LSB). For example, the character K (hexadecimal 4B) is sent as shown below (7 data bits, even parity).



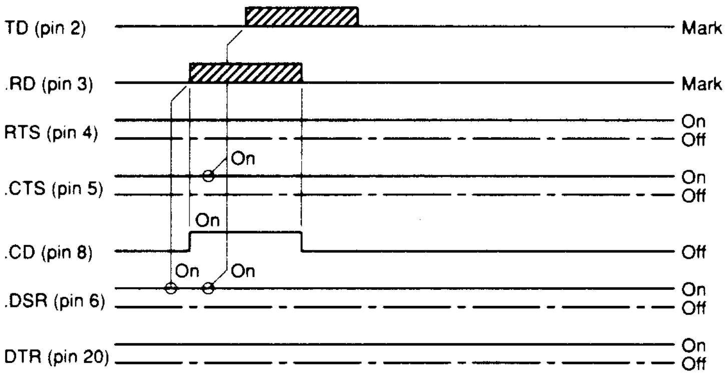
Serial data format

Timing Diagrams

The printer enables or inhibits input control signals for the printer linked with the RS-232C interface. Thus, it enables communication via the RS-232C interface as well as simpler communication.

The timing charts that follow show how the above settings, data communication conditions, and control signals are related.

(1) Full-duplex All-wire Control Mode



NOTES:

Signals prefixed by a dot are input to the printer.

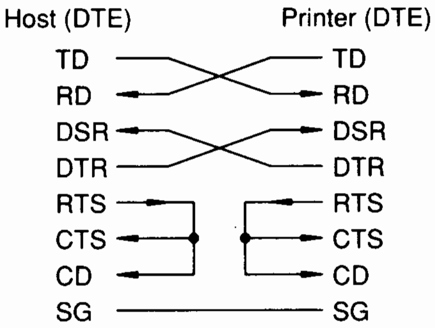
1. DSR must be high when the printer receives data in this mode. Otherwise, received data is rejected.
2. If both DSR and CTS are high when the printer has data to be transmitted to the computer in this mode, the printer transmits the data immediately. If either DSR or CTS is low, data is not transmitted until both signals go high.
3. In this mode, CD is "don't care".

An example of cable wiring:

a. To DCE (data circuit terminating equipment). Use the

"straight-through" cable.

b. To DTE (data terminal equipment). Be sure to use the "cross-patched" cable as shown below.



(2) Full-duplex 3-wire Control Mode

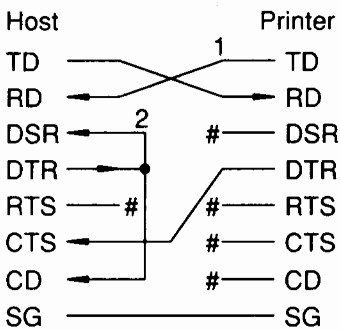
This mode enables simpler communication than the above mode.

Input control signals DRS, CTS, and CD are always treated as high, regardless of their actual states.

Data communication is always enabled even if a computer that does not use any of these input control signals is linked to the terminal.

An example of cable wiring:

This wiring is for IBM PCs and most other personal computers.



#: Indicates the open wire

NOTES:

1. Wire 1 is unnecessary for the DTR (or RC) protocol.
2. Some hosts may not require wire 2.

Data Protocols

Different types of protocol are available for the RS-232C serial interface depending on the computer manufacturer.

- X-ON/X-OFF or DC1/DC3
- DTR
- ETX/ACK
- XON+ETX

These protocols are used to prevent the print data receive buffer from overflowing because interface data is transmitted faster than buffer data. The printer uses specific character codes or an interface signal for each protocol to notify the computer of buffer status.

(1) X-ON/X-OFF or DC1/DC3 protocol

The XOFF (DC3) code (hexadecimal 13) is transmitted from the printer when the input buffer is nearly full. The XON (DC1) code (hexadecimal 11) is transmitted when more data is required from the host computer.

Data might not be processed normally if data is transmitted to the printer when not enough buffer space is available after the XOFF code has been transmitted.

When the printer is first turned on, the DTR signal is set (spaces are sent) and an XON (DC1) code is transmitted from the printer. When the printer is put offline, the XOFF code is transmitted even if the buffer is not full. The XON code is transmitted when the printer is put online again.

If paper runs out or the cover is open, a NAK code (hexadecimal 15) is sent from the printer.

(2) DTR protocol

The DTR signal (pin 20) goes low, ie, the Busy signal is issued

when 255 bytes of data remain in the buffer. When the printer is put offline, the DTR signal becomes inactive.

The transmitter must stop transmission within 255 bytes after the DTR signal is low.

Valid data cannot be guaranteed if data exceeding the buffer capacity is transmitted (the DTR signal is ignored).

Buffer-full recovery timing:

Data transmission is suspended when the DTR signal goes low. Even in this state, printing continues. The DTR signal goes high (a READY signal is issued) when less than 255 bytes of data remain in the buffer.

(3) ETX/ACK protocol

The printer sends ACK (Acknowledge) character (hexadecimal 06) to the computer when it reads out the ETX (End of Text) character (hexadecimal 03) from its print data receive buffer. It does not print the ETX character.

The computer transmits fixed-length messages that are half of buffer length or less. All messages end with ETX character.

When the first message is transmitted to the printer, printing begins and the computer sends the second message to the printer. The printer's receive buffer becomes full. The printer sends the ACK character when the ETX character (end of the first message) is detected. The computer stops sending the third message to the printer.

This procedure can prevent the receive buffer from overflowing. The computer does not send the next message after the first two messages until it receives the ACK character.

Data transmission continues unless the printer finishes printing two messages (enough to fill the receive buffer).

(4) XON+ETX protocol

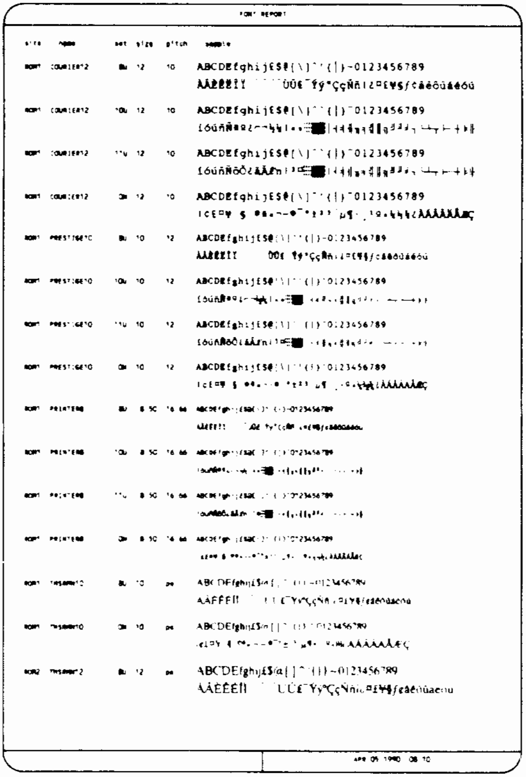
This protocol allows the printer to use both XON/XOFF and ETX/ACK protocols.

E. INFORMATION ON FONTS AND FONT SETS

Fonts and Font Sets

A complete listing of fonts currently available on the printer can be produced by using the **SELECT: action: print: FONTS** action. (see chapter four for details).

This report facility will list all resident fonts as well as those installed on IC cards.



Printer font report

F. CHARACTER SET TABLES

L \ H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	‘	p				¯	â	Å	Á	Þ
1	SOH	DC1	!	1	A	Q	a	q			À	Ý	ê	î	Ã	þ
2	STX	DC2	"	2	B	R	b	r			Â	ý	ô	Ø	ã	·
3	ETX	DC3	#	3	C	S	c	s			È	°	û	Æ	Ð	µ
4	EOT	DC4	$	4	D	T	d	t			Ê	Ç	á	å	ð	¶
5	ENQ	NAK	%	5	E	U	e	u			Ë	ç	é	í	Í	¾
6	ACK	SYN	&	6	F	V	f	v			Î	Ñ	ó	ø	Ì	—
7	BEL	ETB	'	7	G	W	g	w			Ï	ñ	ú	æ	Ó	¼
8	BS	CAN	(	8	H	X	h	x			´	¡	à	Ä	Ò	½
9	HT	EM	)	9	I	Y	i	y			`	¿	è	ì	Õ	ª
A	LF	SUB	*	:	J	Z	j	z			ˆ	¤	ò	Ö	õ	º
B	VT	ESC	+	;	K	[	k	{			¨	£	ù	Ü	Š	«
C	FF	FS	,	<	L	\	l	|			˜	¥	ä	É	š	■
D	CR	GS	-	=	M	]	m	}			Ù	§	ë	ï	Ú	»
E	SO	RS	.	>	N	^	n	~			Û	ƒ	ö	ß	Ÿ	±
F	SI	US	/	?	O	_	o	DEL			₤	¢	ü	Ô	ÿ	

Roman-8 character set

L \ H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p	NUL	DLE	á	░	└	╨	α	≡
1	SOH	DC1	!	1	A	Q	a	q	SOH	DC1	í	▒	┴	╤	β	±
2	STX	DC2	"	2	B	R	b	r	STX	DC2	ó	▓	┬	╥	Γ	≥
3	ETX	DC3	#	3	C	S	c	s	ETX	DC3	ú	│	├	╙	π	≤
4	EOT	DC4	$	4	D	T	d	t	EOT	DC4	ñ	┤	─	╘	Σ	⌠
5	ENQ	NAK	%	5	E	U	e	u	ENQ	NAK	Ñ	╡	┼	╒	σ	⌡
6	ACK	SYN	&	6	F	V	f	v	ACK	SYN	ª	╢	╞	╓	µ	÷
7	BEL	ETB	'	7	G	W	g	w	BEL	ETB	º	╖	╟	╫	τ	≈
8	BS	CAN	(	8	H	X	h	x	BS	CAN	¿	╕	╚	╪	Φ	°
9	HT	EM	)	9	I	Y	i	y	HT	EM	⌐	╣	╔	┘	Θ	∙
A	LF	SUB	*	:	J	Z	j	z	LF	SUB	¬	║	╩	┌	Ω	·
B	VT	ESC	+	;	K	[	k	{	VT	ESC	½	╗	╦	█	δ	√
C	FF	FS	,	<	L	\	l	|	FF	FS	¼	╝	╠	▄	∞	ⁿ
D	CR	GS	-	=	M	]	m	}	CR	GS	¡	╜	═	▌	φ	²
E	SO	RS	.	>	N	^	n	~	SO	RS	«	╛	╬	▐	ε	■
F	SI	US	/	?	O	_	o	DEL	SI	US	»	┐	╧	▀	∩	SP

IBM character set 1

L \ H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p	Ç	É	á	░	└	╨	α	≡
1	SOH	DC1	!	1	A	Q	a	q	ü	æ	í	▒	┴	╤	β	±
2	STX	DC2	"	2	B	R	b	r	é	Æ	ó	▓	┬	╥	Γ	≥
3	♥	DC3	#	3	C	S	c	s	â	ô	ú	│	├	╙	π	≤
4	♦	DC4	$	4	D	T	d	t	ä	ö	ñ	┤	─	╘	Σ	⌠
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	╡	┼	╒	σ	⌡
6	♠	SYN	&	6	F	V	f	v	å	û	ª	╢	╞	╓	µ	÷
7	BEL	ETB	'	7	G	W	g	w	ç	ù	º	╖	╟	╫	τ	≈
8	BS	CAN	(	8	H	X	h	x	ê	ÿ	¿	╕	╚	╪	Φ	°
9	HT	EM	)	9	I	Y	i	y	ë	Ö	⌐	╣	╔	┘	Θ	∙
A	LF	SUB	*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Ω	·
B	VT	ESC	+	;	K	[	k	{	ï	¢	½	╗	╦	█	δ	√
C	FF	FS	,	<	L	\	l	|	î	£	¼	╝	╠	▄	∞	ⁿ
D	CR	GS	-	=	M	]	m	}	ì	¥	¡	╜	═	▌	φ	²
E	SO	RS	.	>	N	^	n	~	Ä	₧	«	╛	╬	▐	∈	■
F	SI	US	/	?	O	_	o	DEL	Å	ƒ	»	┐	╧	▀	∩	SP

IBM character set 2

L \ H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	Ø	►	SP	0	@	P	`	p	Ç	É	á	░	└	╨	α	≡
1	☺	◄	!	1	A	Q	a	q	ü	æ	í	▒	┴	╤	β	±
2	☻	↕	"	2	B	R	b	r	é	Æ	ó	▓	┬	╥	Γ	≥
3	♥	‼	#	3	C	S	c	s	â	ô	ú	│	├	╙	π	≤
4	♦	¶	$	4	D	T	d	t	ä	ö	ñ	┤	─	╘	Σ	⌠
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	╡	┼	╒	σ	⌡
6	♠	▬	&	6	F	V	f	v	å	û	ª	╢	╞	╓	µ	÷
7	•	↨	'	7	G	W	g	w	ç	ù	º	╖	╟	╫	τ	≈
8	◘	↑	(	8	H	X	h	x	ê	ÿ	¿	╕	╚	╪	Φ	°
9	○	↓	)	9	I	Y	i	y	ë	Ö	⌐	╣	╔	┘	Θ	∙
A	◙	→	*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Ω	·
B	♂	←	+	;	K	[	k	{	ï	¢	½	╗	╦	█	δ	√
C	♀	∟	,	<	L	\	l	|	î	£	¼	╝	╠	▄	∞	ⁿ
D	♪	↔	-	=	M	]	m	}	ì	¥	¡	╜	═	▌	φ	²
E	♫	▲	.	>	N	^	n	~	Ä	₧	«	╛	╬	▐	ε	■
F	☼	▼	/	?	O	_	o	⌂	Å	ƒ	»	┐	╧	▀	∩	SP

IBM all-character set

Country \ Dec.	35	36	64	91	92	93	94	96	123	124	125	126
USA	#	$	@	[	\	]	^	`	{	|	}	~
France	£	$	à	°	ç	§	^	`	é	ù	è	¨
Germany	£	$	ß	Ä	Ö	Ü	^	`	ä	ö	ü	~
UK	£	$	@	[	\	]	^	`	{	¦	}	~
Denmark	£	$	@	Æ	Ø	Å	^	'	æ	ø	å	ü
Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Italy	£	$	§	°	ç	é	^	ù	à	ò	è	ì
Spain	£	$	§	¡	Ñ	¿	^	`	°	ñ	ç	~

Diablo 630 international character set

Country \ Dec.	35	36	64	91	92	93	94	96	123	124	125	126
USA	#	$	@	[	\	]	^	`	{	|	}	~
France	#	$	à	°	ç	§	^	`	é	ù	è	¨
Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	β
UK	£	$	@	[	\	]	^	`	{	|	}	~
Denmark 1	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì
Spain	₧	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~

Epson FX-80 international character set

G. ASCII CODE CONVERSION TABLE

The following character sets are used in the conversion tables in this section:

Rmn8	: HP Roman-8 character set
Set 1	: IBM character set 1
Set 2	: IBM character set 2
All	: IBM all-printable character set

Rmn8	Set1	Set2	All	Dec	Hex	Binary	Rmn8	Set1	Set2	All	Dec	Hex	Binary
NUL	NUL	NUL	Ø	0	00	00000000	SP	SP	SP	SP	32	20	00100000
SOH	SOH	SOH	☺	1	01	00000001	!	!	!	!	33	21	00100001
STX	STX	STX	●	2	02	00000010	"	"	"	"	34	22	00100010
ETX	ETX	♥	♥	3	03	00000011	#	#	#	#	35	23	00100011
EOT	EOT	♦	♦	4	04	00000100	$	$	$	$	36	24	00100100
ENQ	ENQ	♣	♣	5	05	00000101	%	%	%	%	37	25	00100101
ACK	ACK	♠	♠	6	06	00000110	&	&	&	&	38	26	00100110
BEL	BEL	BEL	●	7	07	00000111	'	'	'	'	39	27	00100111
BS	BS	BS	◘	8	08	00001000	(	(	(	(	40	28	00101000
HT	HT	HT	○	9	09	00001001	)	)	)	)	41	29	00101001
LF	LF	LF	█	10	0A	00001001	*	*	*	*	42	2A	00101001
VT	VT	VT	♂	11	0B	00001011	+	+	+	+	43	2B	00101011
FF	FF	FF	♀	12	0C	00001100	,	,	,	,	44	2C	00101100
CR	CR	CR	♪	13	0D	00001101	-	-	-	-	45	2D	00101101
SO	SO	SO	♫	14	0E	00001110	.	.	.	.	46	2E	00101110
SI	SI	SI	☼	15	0F	00001111	/	/	/	/	47	2F	00101111
DLE	DLE	DLE	►	16	10	00010000	0	0	0	0	48	30	00110000
DC1	DC1	DC1	◄	17	11	00010001	1	1	1	1	49	31	00110001
DC2	DC2	DC2	↕	18	12	00010010	2	2	2	2	50	32	00110010
DC3	DC3	DC3	‼	19	13	00010011	3	3	3	3	51	33	00110011
DC4	DC4	DC4	¶	20	14	00010100	4	4	4	4	52	34	00110100
NAK	NAK	§	§	21	15	00010101	5	5	5	5	53	35	00110101
SYN	SYN	SYN	▬	22	16	00010110	6	6	6	6	54	36	00110110
ETB	ETB	ETB	↨	23	17	00010111	7	7	7	7	55	37	00110111
CAN	CAN	CAN	↑	24	18	00011000	8	8	8	8	56	38	00111000
EM	EM	EM	↓	25	19	00011001	9	9	9	9	57	39	00111001
SUB	SUB	SUB	→	26	1A	00011001	:	:	:	:	58	3A	00111001
ESC	ESC	ESC	←	27	1B	00011011	;	;	;	;	59	3B	00111011
FS	FS	FS	∟	28	1C	00011100	<	<	<	<	60	3C	00111100
GS	GS	GS	↔	29	1D	00011101	=	=	=	=	61	3D	00111101
RS	RS	RS	▲	30	1E	00011110	>	>	>	>	62	3E	00111110
US	US	US	▼	31	1F	00011111	?	?	?	?	63	3F	00111111

Rmn8	Set1	Set2	All	Dec	Hex	Binary	Rmn8	Set1	Set2	All	Dec	Hex	Binary
@	@	@	@	64	40	01000000	'	`	`	`	96	60	01100000
A	A	A	A	65	41	01000001	a	a	a	a	97	61	01100001
B	B	B	B	66	42	01000010	b	b	b	b	98	62	01100010
C	C	C	C	67	43	01000011	c	c	c	c	99	63	01100011
D	D	D	D	68	44	01000100	d	d	d	d	100	64	01100100
E	E	E	E	69	45	01000101	e	e	e	e	101	65	01100101
F	F	F	F	70	46	01000110	f	f	f	f	102	66	01100110
G	G	G	G	71	47	01000111	g	g	g	g	103	67	01100111
H	H	H	H	72	48	01001000	h	h	h	h	104	68	01101000
I	I	I	I	73	49	01001001	i	i	i	i	105	69	01101001
J	J	J	J	74	4A	01001001	j	j	j	j	106	6A	01101001
K	K	K	K	75	4B	01001011	k	k	k	k	107	6B	01101011
L	L	L	L	76	4C	01001100	l	l	l	l	108	6C	01101100
M	M	M	M	77	4D	01001101	m	m	m	m	109	6D	01101101
N	N	N	N	78	4E	01001110	n	n	n	n	110	6E	01101110
O	O	O	O	79	4F	01001111	o	o	o	o	111	6F	01101111
P	P	P	P	80	50	01010000	p	p	p	p	112	70	01110000
Q	Q	Q	Q	81	51	01010001	q	q	q	q	113	71	01110001
R	R	R	R	82	52	01010010	r	r	r	r	114	72	01110010
S	S	S	S	83	53	01010011	s	s	s	s	115	73	01110011
T	T	T	T	84	54	01010100	t	t	t	t	116	74	01110100
U	U	U	U	85	55	01010101	u	u	u	u	117	75	01110101
V	V	V	V	86	56	01010110	v	v	v	v	118	76	01110110
W	W	W	W	87	57	01010111	w	w	w	w	119	77	01110111
X	X	X	X	88	58	01011000	x	x	x	x	120	78	01111000
Y	Y	Y	Y	89	59	01011001	y	y	y	y	121	79	01111001
Z	Z	Z	Z	90	5A	01011001	z	z	z	z	122	7A	01111001
[	[	[	[	91	5B	01011011	{	{	{	{	123	7B	01111011
\	\	\	\	92	5C	01011100	|	|	|	|	124	7C	01111100
]	]	]	]	93	5D	01011101	}	}	}	}	125	7D	01111101
^	^	^	^	94	5E	01011110	~	~	~	~	126	7E	01111110
_	_	_	_	95	5F	01011111	DEL	DEL	DEL	⌂	127	7F	01111111

Rmn8	Set 1	Set 2	All	Dec	Hex	Binary	Rmn8	Set 1	Set 2	All	Dec	Hex	Binary
	NUL	Ç	Ç	128	80	10000000		á	á	á	160	A0	10010000
	SOH	ü	ü	129	81	10000001	À	í	í	í	161	A1	10010001
	STX	é	é	130	82	10000010	Â	ó	ó	ó	162	A2	10010010
	ETX	â	â	131	83	10000011	È	ú	ú	ú	163	A3	10010011
	EOT	ä	ä	132	84	10000100	Ê	ñ	ñ	ñ	164	A4	10010100
	ENQ	à	à	133	85	10000101	Ë	Ñ	Ñ	Ñ	165	A5	10010101
	ACK	å	å	134	86	10000110	Î	ª	ª	ª	166	A6	10010110
	BEL	ç	ç	135	87	10000111	Ï	º	º	º	167	A7	10010111
	BS	ê	ê	136	88	10001000	´	¿	¿	¿	168	A8	10011000
	HT	ë	ë	137	89	10001001	`	⌐	⌐	⌐	169	A9	10011001
	LF	è	è	138	8A	10001001	ˆ	¬	¬	¬	170	AA	10011001
	VT	ï	ï	139	8B	10001011	¨	½	½	½	171	AB	10011011
	FF	î	î	140	8C	10001100	˜	¼	¼	¼	172	AC	10011100
	CR	ì	ì	141	8D	10001101	Ù	¡	¡	¡	173	AD	10011101
	SO	Ä	Ä	142	8E	10001110	Û	«	«	«	174	AE	10011110
	SI	Å	Å	143	8F	10001111	₤	»	»	»	175	AF	10011111
	DLE	É	É	144	90	10010000	¯	░	░	░	176	B0	10110000
	DC1	æ	æ	145	91	10010001	Ý	▒	▒	▒	177	B1	10110001
	DC2	Æ	Æ	146	92	10010010	ý	▓	▓	▓	178	B2	10110010
	DC3	ô	ô	147	93	10010011	°	│	│	│	179	B3	10110011
	DC4	ö	ö	148	94	10010100	Ç	┤	┤	┤	180	B4	10110100
	NAK	ò	ò	149	95	10010101	ç	╡	╡	╡	181	B5	10110101
	SYN	û	û	150	96	10010110	Ñ	╢	╢	╢	182	B6	10110110
	ETB	ù	ù	151	97	10010111	ñ	╖	╖	╖	183	B7	10110111
	CAN	ÿ	ÿ	152	98	10011000	¡	╕	╕	╕	184	B8	10111000
	EM	Ö	Ö	153	99	10011001	¿	╣	╣	╣	185	B9	10111001
	SUB	Ü	Ü	154	9A	10011001	¤	║	║	║	186	BA	10111001
	ESC	¢	¢	155	9B	10011011	£	╗	╗	╗	187	BB	10111011
	FS	£	£	156	9C	10011100	¥	╝	╝	╝	188	BC	10111100
	GS	¥	¥	157	9D	10011101	§	╜	╜	╜	189	BD	10111101
	RS	₧	₧	158	9E	10011110	ƒ	╛	╛	╛	190	BE	10111110
	US	ƒ	ƒ	159	9F	10011111	¢	┐	┐	┐	191	BF	10111111

Rmn8	Set1	Set2	All	Dec	Hex	Binary	Rmn8	Set1	Set2	All	Dec	Hex	Binary
â	└	└	└	192	C0	11000000	Á	α	α	α	224	E0	11100000
ê	┴	┴	┴	193	C1	11000001	Ã	β	β	β	225	E1	11100001
ô	┬	┬	┬	194	C2	11000010	ã	Γ	Γ	Γ	226	E2	11100010
û	├	├	├	195	C3	11000011	Đ	π	π	π	227	E3	11100011
á	─	─	─	196	C4	11000100	đ	Σ	Σ	Σ	228	E4	11100100
é	┼	┼	┼	197	C5	11000101	Í	σ	σ	σ	229	E5	11100101
ó	╞	╞	╞	198	C6	11000110	Ì	μ	μ	μ	230	E6	11100110
ú	╟	╟	╟	199	C7	11000111	Ó	τ	τ	τ	231	E7	11100111
à	╚	╚	╚	200	C8	11001000	Ò	Φ	Φ	Φ	232	E8	11101000
è	╔	╔	╔	201	C9	11001001	Õ	Θ	Θ	Θ	233	E9	11101001
ò	╩	╩	╩	202	CA	11001001	õ	Ω	Ω	Ω	234	EA	11101001
ù	╦	╦	╦	203	CB	11001011	Š	δ	δ	δ	235	EB	11101011
ä	╠	╠	╠	204	CC	11001100	š	∞	∞	∞	236	EC	11101100
ë	═	═	═	205	CD	11001101	Ú	φ	φ	φ	237	ED	11101101
ö	╬	╬	╬	206	CE	11001110	Ÿ	∈	∈	∈	238	EE	11101110
ü	╧	╧	╧	207	CF	11001111	ÿ	∩	∩	∩	239	EF	11101111
Å	╨	╨	╨	208	D0	11010000	Þ	≡	≡	≡	240	F0	11110000
î	╤	╤	╤	209	D1	11010001	þ	±	±	±	241	F1	11110001
Ø	╥	╥	╥	210	D2	11010010	·	≥	≥	≥	242	F2	11110010
Æ	╙	╙	╙	211	D3	11010011	µ	≤	≤	≤	243	F3	11110011
å	╘	╘	╘	212	D4	11010100	¶	⌠	⌠	⌠	244	F4	11110100
í	╒	╒	╒	213	D5	11010101	¾	⌡	⌡	⌡	245	F5	11110101
ø	╓	╓	╓	214	D6	11010110	—	+	+	+	246	F6	11110110
æ	╫	╫	╫	215	D7	11010111	¼	≈	≈	≈	247	F7	11110111
Ä	╪	╪	╪	216	D8	11011000	½	°	°	°	248	F8	11111000
ì	┘	┘	┘	217	D9	11011001	ª	•	•	•	249	F9	11111001
Ö	┌	┌	┌	218	DA	11011001	º	·	·	·	250	FA	11111001
Ü	█	█	█	219	DB	11011011	«	√	√	√	251	FB	11111011
É	▄	▄	▄	220	DC	11011100	■	ⁿ	ⁿ	ⁿ	252	FC	11111100
ï	▌	▌	▌	221	DD	11011101	»	²	²	²	253	FD	11111101
ß	▐	▐	▐	222	DE	11011110	±	■	■	■	254	FE	11111110
Ô	▀	▀	▀	223	DF	11011111		SP	SP	SP	255	FF	11111111

Appendices, Glossary & Index

H. COMMAND SETS

Fujitsu M304X Line Printer Emulation

NUL	Media fill character -ignored
ETX	Used for ETX/ACK flow control
BEL	Sound printer buzzer -ignored
LF	Advance one line according to lpi setting
VT	Advance to next vertical tab stop
FF	Advance to top of form (form feed)
CR	Perform carriage return
DC1	Select printer
DC3	Deselect printer
ESC 6	Set 6 lpi spacing
ESC 8	Set 8 lpi spacing
ESC 0	Set default line spacing
GS data	Start VFU definition - followed by VFU data
RS	End VFU definition
US n	Skip to channel n
US n	Skip n lines
DEL	Cancel line

HP LaserJet Series II Emulation

NUL	Media fill character - ignored
BEL	Sound printer buzzer-ignored
BS	Backspace
HT	Horizontal tab
LF	Advance one line according to lpi setting
FF	Advance to top of form (Form Feed)
CR	Perform carriage return

SO	Select secondary font
SI	Select primary font
ESC	Lead-in for escape sequences
ESC &anC	Set horizontal position to column n
ESC &anH	Set horizontal position to n/720 inch
ESC &anL	Set left margin to column n
ESC &anM	Set right margin to column n
ESC &anR	Set vertical position to row n
ESC &anV	Set vertical position to n/720 inch
ESC *pnX	Set horizontal position to dot position n
ESC *pnY	Set vertical position to dot position n
ESC &d@	Underline off
ESC &dD	Underline on

Save Print Position

ESC &f0S	Push (save) current print position
ESC &f1S	Pop (restore) saved position

Macro Operation

ESC &fnY	Select macro ID n as identified macro
ESC &fnX	Macro control command

Switch Line Termination Mode

ESC &k0G	Set line termination mode CRLF
ESC &k1G	Set line termination mode CR
ESC &k2G	Set line termination mode LF
ESC &k3G	Set line termination mode CR or LF
ESC &knH	Set horizontal spacing as n/120 inch

Set Standard or Compressed Font Pitch

ESC &k0S	Select standard pitch
ESC &k2S	Select compressed pitch

Set Paper Size

ESC &l1A	Set Executive page size (7.25" x 10.5")
ESC &l2A	Set Letter page size (8.5" x 11")
ESC &l3A	Set Legal page size (8.5" x 14")
ESC &l26A	Set A4 page size (210mm x 297mm)

Set Vertical Line Spacing

ESC &lnC	Set line spacing as n/48 inch
ESC &lnD	Set line spacing as n lines per inch
ESC &lnE	Set top margin to n lines
ESC &lnF	Set text length to n lines
ESC &l0H	Eject page
ESC &l1H	Select main cassette feed
ESC &l2H	Select manual feed

Perforation Skip Mode

ESC &l0L	Perforation skip off
ESC &l1L	Perforation skip on
ESC &lnP	Set page length to n lines

Output Stacking Control

ESC &l1T	Toggle stacking control
ESC &lnX	Set copy count to n
ESC &pnX...	Print transparent n following bytes

Print Bit-Image Graphics Data

ESC *tnR	Set graphics resolution (75,100,150,300)
ESC *r0A	Start graphics - left graphics margin
ESC *r1A	Start graphics - current position
ESC *bnW...	Graphics data
ESC *rB	End graphics

Print Pre-Defined Graphic Pattern

ESC *cnA	Set horizontal rule/pattern size in dots
ESC *cnB	Set vertical rule/pattern size in dots
ESC *cnV	Set vertical rule/pattern size in dots
ESC *cnG	Specify grey scale level/pattern ID n
ESC *c2P	Draw grey scale
ESC *c3P	Draw pattern
ESC *c0P	Draw rule

Line Wrap Control

ESC &s0C	Enable line wrap
ESC &s1C	Disable line wrap

Font Management Commands

ESC &l0O	Set portrait orientation
ESC &l1O	Set landscape orientation
ESC (nc	Set symbol-set (primary)
ESC)nc	Set symbol-set (secondary)
ESC (s0P	Set fixed spacing (primary)
ESC (s1P	Set proportional spacing (primary)
ESC)s0P	Set fixed spacing (secondary)
ESC)s1P	Set proportional spacing (secondary)

ESC (snH	Set font pitch n (primary)
ESC (snV	Set point size n (primary)
ESC)snV	Set point size n (secondary)
ESC (s0S	Set upright style (primary)
ESC (s1S	Set italic style (primary)
ESC)s0S	Set upright style (secondary)
ESC)s1S	Set italic style (secondary)
ESC (snB	Set stroke weight n (primary)
ESC)snB	Set stroke weight n (secondary)
ESC (snT	Set typeface n (primary)
ESC)snT	Set typeface n (secondary)

Other Font Management Commands

ESC (n@	Select default primary font
ESC)n@	Select default secondary font
ESC *cnD	Set font n as identified font
ESC *c5F	Designate font last identified as permanent
ESC *c4F	Designate font last identified as temporary
ESC *c2F	Delete font last identified
ESC *c1F	Delete all temporary fonts
ESC *c0F	Delete all non-resident fonts
ESC *c6F	Copy current font to font last identified

Downloading Fonts

ESC (nX	Select download font n as primary
ESC)nX	Select download font n as secondary
ESC)snW...	Download font n descriptor
ESC *cnE	Set code n as identified character

ESC *c3F	Delete character last identified
ESC (snW...	Download character n definition
ESC 9	Clear margins
ESC =	Half feed
ESC E	Reset printer state

Display Functions Mode

ESC Y	Enable display functions mode
ESC Z	Disable display functions mode

Additional Commands

ESC BEL	Switch to Fujitsu extended command mode
ESC ESC BEL	Select LAYOUT mode
ESC X	Revert to previous mode (after ESC BEL)

Diablo 630 Emulation

ESC B	Select upright (print in primary colour)
ESC A	Select Italics (print in secondary colour)
ESC O	Bold print on - up to CR or ESC and or ESC X
ESC R	Auto underscore off
ESC W	Shadow print on - Up to CR or ESC and or ESC X
ESC &	Cancel bold/shadow
ESC E	Auto underscore on
ESC	Auto underscore on (alternative)
SO	Shift out - select secondary character set

SI	Shift in - select primary character set
ESC M	Auto justify on
ESC =	Auto center on - for one line
ESC P	Proportional print on
ESC Q	Proportional print off
ESC T	Set top margin
ESC L	Set bottom margin
ESC C	Clear top and bottom margins
ESC 0	Set right margin at current horizontal position
ESC 9	Set left margin at current horizontal position
ESC FF n	Set lines per page
ESC 8	Clear tab at current horizontal position
ESC -	Set vertical tab stop at vertical position
ESC 1	Set horizontal tab stop at current horizontal position
ESC 2	Clear all horizontal and vertical tabs
CR	Carriage return
LF	Line feed
HT	Tab to next defined horizontal tab stop
VT	Vertical tab to next defined vertical tab stop
ESC VT n	Absolute vertical tab to line n
ESC HT n	Absolute horizontal tab to print position n
FF	Form feed - close current page
ESC RS n	Set VMI to (n-1)/48 inch (n must be between 1 and 126)
ESC US n	Set HMI to (n-1)/120 inch (n must be between 1 and 126)

ESC S	Reset HMI
ESC D	Negative half line feed - by 1/2 VMI
ESC LF	Negative line feed
ESC U	Half line feed - by 1/2 VMI
ESC BS	Backspace 1/120 inch
BS	Backspace by HMI (HMI or 1/60 inch)
NUL	Media fill character - ignored
DEL	Media fill character - ignored
ETX	Used for ETX/ACK flow control
ESC <	Enable inverted print direction
ESC >	Enable normal print direction
ESC 5	Forward print on
ESC 6	Backward print on
DC3	Deselect print - ignore characters up to DC1
DC1	Select printer
ESC	Lead-in for escape sequences
ESC CR P	Remote reset (taken as document boundary)
ESC DC1 n	Set offset (adjustment to horizontal motion)
ESC !	Disable auto line-break
ESC ?	Enable auto line-break
ESC 7	Print suppression on - up to CR
ESC 3	Graphics mode on - up to CR or ESC 4
ESC 4	Graphics mode off
ESC X	Cancel Word-Processing modes
ESC Y	Print font character 32
ESC Z	Print font character 127
//**1**//	Select main cassette feed

//2//	Select secondary cassette feed
//E//	Select manual feed
//C//	Select main/secondary feed
//R//	Eject page
ESC EM 1	Select main cassette feed (alternative)
ESC EM 2	Select secondary cassette feed (alternative)
ESC EM E	Select manual feed (alternative)
ESC EM C	Select main/secondary cassette feed (alternative)
ESC EM R	Eject page (alternative)

Additional Commands

ESC BEL	Escape to Fujitsu extended command mode
ESC ESC BEL	Escape to LAYOUT DDL

Qume Sprint 11 Emulation Commands

ESC Q	Shadow print on
ESC R	Shadow print off
ESC I	Auto underscore on
ESC J	Auto underscore off
ESC K n	Bold overprint on
ESC M	Bold overprint off
ESC $	Proportional spacing on
ESC %	Proportional spacing off
ESC F n1 n2	Define form length as (n1*10+n2)/6 inches
ESC 9	Set left margin at horizontal position
ESC 0	Set right margin at current horizontal position

ESC +	Set top margin at current vertical position
ESC -	Set bottom margin at current vertical position
ESC O	Right margin control on
ESC Y	Right margin control off
ESC 1	Set horizontal tab at current position
ESC 8	Clear horizontal tab at current position
ESC VT n	Absolute vertical tab to line n
ESC P n1 n2	Absolute vertical tab to line (n1*10)+n2
ESC C n1 n2	Absolute horizontal tab to column (n1*10)+n2
ESC HT n	Absolute horizontal tab to column n
HT	Horizontal tab to next defined tab stop
VT	Tab to next defined vertical tab stop
ESC 2	Clear all horizontal tabs
ESC (list.	Set tab list
ESC)list.	Clear tab list
ESC RS n	Set VMI to n/48 inch
ESC US n	Set HMI to n/120 inch
ESC E n1 n2	Define horizontal spacing by n1 n2
ESC L n1 n2	Define vertical spacing by n1 n2
ESC N	No carriage movement to next character
BS	Backspace by HMI
ESC BS	Backspace 1/120 inch
LF	Line feed by VMI
ESC U	Half line feed - by 1/2 VMI
ESC LF	Negative line feed
ESC D	Negative half line feed - by 1/2 VMI

FF	Form feed - eject current page
CR	Carriage return
ESC V n1 n2 n3	Relative vertical movement (in 1/48")
ESC H n1 n2 n3	Relative horizontal movement (in 1/120")
ESC 5	Forward print on
ESC 6	Backward print on, up to CR or ESC 5
ESC <	Enable bi-directional printing
ESC >	Disable bi-directional printing
NUL	Media fill character - ignored
DEL	Media fill character - ignored
BEL	Audible alarm - no effect
ESC	Lead-in for escape sequences
ETX	Used for escape sequences
ESC CR P	Printer reset
ESC SP	Print font character 32
ESC /	Print font character 127
ESC ,	Auto line feed on
ESC .	Auto line feed off
ESC S	Suppress print on
ESC T	Suppress print off
ESC W	Auto line-break on
ESC Z	Auto line-break off
ESC 3	Graphic mode on (HMI=1/60", VMI=1/48")
ESC G	Graphic mode on (HMI-1/120", VMI-1/48")
ESC 4	Graphic mode off
ESC i	Select main cassette feed
ESC j	Select secondary cassette feed

ESC e	Eject page
ESC _	Auto underscore on (alternative)
ESC BEL	Escape to LaserJet
ESC ESC BEL	Escape to LAYOUT

Epson FX-80 Emulation

ESC E	Emphasized mode on
ESC F	Emphasized mode off
ESC G	Double-strike mode on
ESC H	Double-strike mode off
ESC 4	Select secondary character set (italic)
ESC 5	Select normal character set
ESC -1	Underline on
ESC -0	Underline off
ESC S0	Superscript mode on
ESC S1	Subscript mode on
ESC T	Superscript or subscript mode off
ESC SO	Enlarged mode on for one line
SO	Enlarged mode on for one line (alternative)
DC4	One-line enlarged mode off
ESC W1	Enlarged mode on
ESC W0	Enlarged mode off
ESC SI	Condensed mode on (alternative)
DC2	Condensed mode off
ESC M	Select elite-mode spacing (12 cpi)
ESC P	Select pica-mode spacing (10 cpi - normal)
ESC p1	Proportional spacing on
ESC p0	Proportional spacing off

ESC !n	Select print mode n
ESC Cn	Set form length as n lines
ESC C0n	Set form length as n inches
ESC ln	Set left margin to column n
ESC Qn	Set line length to n columns
ESC Nn	Set skip vertical perforations (bottom margin) to n lines
ESC O	Cancel skip-over perforation (bottom margin)
ESC D...NUL	Set horizontal tabs at positions specified
ESC bnml...NUL	Define vertical tab position for vertical tab channel n
ESC Bn1...NUL	Define vertical tabs to position for channel n
ESC ESC /n	Select vertical tab channel n
HT	Horizontal tab to next defined stop
VT	Vertical tab to next defined stop
FF	Form feed - close current page
CR	Carriage return
ESC jn	Reverse line feed by n/216 inch
LF	Line Feed by current line spacing
ESC 0	Set line spacing to 1/8 inch
ESC 1	Set line spacing to 7/72 inch
ESC 2	Set line spacing to 1/6 inch
ESC 3n	Set line spacing to n/216 inch
ESC An	Set line spacing to n/72 inch
ESC Jn	Line feed by n/216 inch
NUL	Media fill character - ignored
BS	Backspace by current character width
DC3	Deselect printer - ignore characters

	up to DC1
DC1	Select printer
CAN	Cancel line - clear print buffer
ESC	Lead-in for escape sequences
DEL	Delete last character in print buffer
ESC 6	Enable printing of codes 128 to 159
ESC 7	Disable printing of codes 128 to 159
ESC =	Force bit 7 of subsequent data to zero
ESC >	Force bit 7 of subsequent data to one
ESC #	Cancel bit 7 control
ESC @	Reset printer (taken as document boundary)
ESC I1	Enable print of undefined ASCII codes
ESC I0	Disable print of undefined ASCII codes
ESC Rn	Select international character set n
ESC *m	Print 8 pin bit-image data in mode m
ESC Y...	Print graphics 120 DPI
ESC Z...	Print graphics 240 DPI
ESC ^m...	Print 9 pin bit image in mode m
ESC K...	Print graphics 60 DPI
ESC L...	Print graphics 120 DPI

Additional Commands

ESC BEL	Switch to Fujitsu extended command mode
ESC ESC BEL	Select LAYOUT mode
ESC ESC ESC BEL	End of document - eject page

IBM Proprinter Emulation

ESC E	Emphasised mode on
ESC F	Double-strike mode on
ESC H	Double-strike mode off
ESC -1	Underline on
ESC -0	Underline off
ESC _1	Overscoring on
ESC _0	Overscoring off
ESC B...NUL	Define vertical tabs at positions specified
ESC D...NUL	Set horizontal tabs
ESC R	Restore all tabs to default values
CR	Carriage return
LF	Line feed
HT	Tab to next defined horizontal tab stop
VT	Vertical tab to next defined vertical tab stop
FF	Form feed - close current page
ESC 0	Set line spacing to 1/8 inch
ESC 1	Set line spacing to 7/72 inch
ESC 2	Invoke line spacing set by ESC A
ESC 3n	Set line spacing to n/216 inch
ESC Jn	Line feed by n/216 inch
ESC An	Store line spacing at n/72 inch
ESC S0	Superscript mode on
ESC S1	Subscript mode on
ESC T	Superscript or Subscript mode off
ESC SO	Enlarged mode on for one line
SO	Enlarged mode on for one line (alternative)

DC4	One-line enlarged mode off
ESC W1	Enlarged mode on
ESC W0	Enlarged mode off
ESC SI	Condensed mode on
SI	Condensed mode on (alternative)
ESC :	Select elite-mode spacing (12 cpi)
DC2	Condensed and elite-spacing mode off
ESC Cn	Set form length as n lines
ESC C0n	Set form length as n inches
ESC Nn	Set skip over perforation (bottom margin) to n lines
ESC O	Cancel skip over perforation (bottom margin)
ESC 4	Set top margin to current position
ESC Xmn	Set horizontal margins
NUL	Media fill character - ignored
BS	Backspace by current character width
DC3	Deselect print - ignore characters up to DC1
DC1	Select printer
ESC Q ETX	Deselect printer (alternative)
CAN	Cancel line - clear print buffer
ESC	Lead-in for escape sequences
ESC 6	Enable printing of codes 128 to 159
ESC 7	Disable printing of codes 128 to 159
ESC 51	Enable auto LF for CR
ESC 50	Disable auto LF for CR
ESC /n1n2	Treat n1n2 (16 bit) following characters as printable
ESC ^c	Treat single character c as printable

ESC K...	Print normal-density bit-image data (60 dpi)
ESC L...	Print dual density bit-image (120 dpi)
ESC Y...	Print 2x speed dual-density bit-image (120 dpi)
ESC Z...	Print quadruple-density bit-image (240 dpi)

Additional Commands

ESC BEL	Switch to LaserJet mode
ESC ESC BEL	Select LAYOUT mode
ESC ESC ESC BEL	End of document - eject page

LAYOUT Command Set (Document Description Language)

LAYOUT programming is best learned with the use of detailed programming aids. To utilise this language please order the full LAYOUT programme manuals P/N FS810071 and the LAYOUT PRIMER P/N FS810094 from your nearest Fujitsu dealer.

Fujitsu Extended Command Set

ESC BEL	Activate extended command control
ESC X	Switch back to emulation mode*
ESC +f16E	Select emulation (Diablo 630 API/ES.CS)*
ESC +f17E	Select emulation (Qume Sprint 11)*
ESC +f33E	Select emulation (IBM Proprinter)*
ESC +f34E	Select emulation (Epson FX-80)*
ESC +f96E	Select emulation (Fujitsu LP M304X)*
ESC +f112E	Select emulation (LAYOUT)*
ESC &l0H	Paper feed selection (eject current

	page)
ESC &l1H	Paper feed selection (main cassette)
ESC &l2H	Paper feed selection (manual feed)
ESC &l3H	Paper feed selection (not used)
ESC &l4H	Paper feed selection (second cassette)
ESC &l5H	Paper feed selection (auto cassette select)
ESC O	Stacker offset
ESC &l0O	Page orientation portrait (0 degrees)
ESC &l1O	Page orientation landscape (270 degrees)
ESC &cnM	Character manipulation by value of n
ESC &lnW	Copy range n copies (n is a value between 1 and 255)
ESC &lnX	Copy start (n is a value between 1 and 255)
ESC Z	Self test
ESC *cnD	Specify font ID
ESC *cnE	Specify Character code
ESC)snW [data]	Create font
ESC *cnF	Font and character control
ESC (snW [data]	Download character
ESC (f n1 i n2 o n3 v n4 h n5;	Select font
ESC (nX	Make active font corresponding to last speed ID
ESC *tnR	Specify resolution
ESC *rnA	Start raster graphics
ESC *bnW [raster data]	Transfer raster graphics
ESC *rB	End raster graphics

* Use of these commands will take effect and exit the "Extended Command Mode" when invoked. If further extended commands are required after use of either of these commands "ESC BEL" must be used to enter the "Extended Command Mode" and if an emulation selection has been made you must select the new emulation as needed.

I. GLOSSARY

A3 Size: A standard European paper size, 297mm x 420mm.

A4 Size: A standard European letter size, 210mm x 297mm.

AC Power Cord: Provides electricity to the printer (two pins for power and one pin for earth connection).

Application Software: Program which provides a solution to a particular problem such as maintaining an inventory or creating a report.

ASCII: An acronym for American Standard Code for Information Interchange, or the code sent to the printer with a unique binary coded number for each character.

B5 Size: A standard Japanese letter size, 182mm x 257mm.

Baud Rate: The speed of data transmission to the printer. Applies to serial data only. The baud rate is equal to the number of bits transmitted per second.

Bit: A bit is the smallest unit of data and has a value of 0 or 1.

Buffer: Storage area for data sent from the computer to the printer.

Byte: Eight bits that are considered as one symbol. Used to represent a single character such as a number, a letter, or a special control character.

Card Slot: An opening to install an optional font or emulation card.

Carriage Return: The return of the cursor to the beginning of the next line.

Character: Any letter, number, or symbol.

Command: An instruction that tells the computer what to do. A command usually consists of words, parts of words, or codes. The computer will only respond to those commands that are accepted by the program which the computer is currently running.

Command set: The series of print or format instructions embedded in the printer firmware and activated by codes sent from the host computer.

Compatibility: The capability of substituting for another printer, including both plug-compatibility and command compatibility.

Corona Wire: A fine wire to impart an electrical charge to the photoconductive drum to make it sensitive to the light (pre-charger) or impart a charge to the paper to make the toner move from drum to paper (transfer charger).

Data: Another word for information.

Data Circuit Terminating Equipment (DCE): The side of an interface that provides functions necessary for connection or signal transformation between data terminal equipment and data transmission line, usually modems.

Data Terminal Equipment (DTE): The side of an interface that acts as a data source and/or sink, usually computers or computer terminals.

Default: A printer parameter that the printer returns to when power is turned on.

Downloading: Transferring character font matrix data from the computer to the printer's memory to enable the printer to print specially designed characters.

Emulation: Exactly executing a command set defined for a different printer and producing the identical results.

Emulation Card: Plug-in unit that has memory chips for providing an optional emulation for the printer.

EPROM: Erasable and programmable read-only memory. A kind of ROM that can be erased and re-programmed by the user.

Escape Sequence: A command beginning with an ESC code to expand the variety of command sets.

Font: A complete set of type in one size and style of characters.

Font Card: An IC card containing matrix data of characters to enable the printer to print various styles of fonts.

Form Feed: A signal to the printer to advance the cursor to the top of the next page. It starts printing of data in the buffer.

Form Length: A printer setting for the spacing between top-of-form positions measured in inches.

Format: The shape and appearance of printer output, including page size, character width and spacing, line spacing, etc.

Hex Dump: Special debugging tool used to analyse printer malfunctions and computer program errors. Control codes and print data are printed as hexadecimal values.

Hopper: A unit capable of handling cut sheets or equivalent continuously.

IC Card: Plug-in unit that has memory chips to provide a variety of fonts and

emulations for the printer.

Interface: The connection that transfers electrical signals from one part of a system to another, eg from the computer to the printer and vice versa.

International Characters: Characters or symbols specific to each language.

LCD Display: A 16-digit dot-matrix display to show messages in easy-to-read characters.

Legal Size: A US legal size, 8.5 x 14 inches.

Letter Size: A US letter size, 8.5 x 11 inches.

Line Spacing: The vertical spacing between lines, measured in lines per inch.

Matrix: An array of elements; in the case of dot matrix printers the arrangement of the pins that form the letters through closely spaced dots.

Nonvolatile Memory: A memory that retains information even if power is turned off.

Offline: Mode in which printer operations are not performed, but printer parameters, for example, are set.

Online: Mode in which the printer is enabled to print whatever is set to its buffer.

OPC Drum: Another word for the photoconductive drum.

Photoconductive Drum: Component on which patterns are produced by the laser unit.

Power Switch: The ON/OFF switch located on the right side toward the back of the printer. The switch is labelled with the international designations 1 for ON and 0 for OFF.

Proportional Spacing: Character width differs from one character to another.

RAM:	Random-access memory. A volatile, temporary storage area.
Reset:	A function performed by turning the printer OFF and then ON again, or via the **SELECT: action: reset: SYSTEM** action.
ROM:	Read-only memory. A memory that cannot be changed in the normal use.
Toner:	Charged carbon particles that adhere to charged areas on the photoconductive drum to produce a visible image on the drum. The heat roller melts toner transferred to the paper into a permanent image on the paper.
Top-of-Form:	The very top of a page of text.
Warm-up Time:	The period required until the printer becomes ready for printing after power is first turned on.

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